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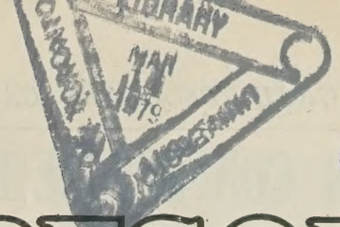

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NATURAL RESOURCES CANADA

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VOL. 3 JANUARY, 1924 NO. 1

COMMON PROBLEMS OF THE UNITED STATES AND CANADA REVIEWED

Hon. Charles Stewart, Minister of the Interior, Addresses Chicago Business Men on International Questions

TAKING as his subject, "Common Problems of the United States and Canada", Hon. Charles Stewart, Minister of the Interior, Canada, in an address in Chicago on December 13, 1923 before the Industrial Club, an organization of leading business men of that city, reviewed some of the more important of the innumerable subjects on which the interests of the two countries meet. The address covered a wide field but dealt more particularly with those questions which have to do with the development and conservation of natural resources.

At the outset Mr. Stewart took occasion to point out the tendency, in discussing Canadian-American relations, to over-emphasize boundary matters which, owing to the character of the problems they involved and to the co-operative arrangements necessary to deal with them, naturally received a great deal of publicity. He expressed the view that the most powerful forces linking the United States and Canada were not those that gave rise to a chain of co-operative enterprises along the boundary but rather those that crossed the line—mutual interests and influences almost infinite in number and variety.

In this connection Mr. Stewart instanced the case of the agricultural development of the United States and Canada, and the influence that each country had exerted upon the other with respect to the advance, first, of pioneer settlement and later of permanent agriculture. Mr. Stewart recalled that through a long series of decades there was an almost constant stream of Canadian farmers of the best pioneer stock flowing in to build up the immense agricultural domain of the states of the West and Middle West. They joined forces in Michigan and Kansas and Nebraska with the army of land-seekers from the Ohio valley and from east of the Alleghanies and Appalachians. Later, not so many years ago, the advance of land settlement swept northward to the prairies of Western Canada and the United States' settler became one of the chief factors in the colonization of what were now the provinces of Manitoba, Saskatchewan, and Alberta.

"Great as are our common interests along the border", said Mr. Stewart, "there is nothing in our co-operative boundary undertakings to compare in international importance, with the mutual influences exerted by this ebb and flow of pioneer stock to build up the farming communities, first of one country and then of the other."

Hon. Charles Stewart, Minister of the Interior, at his desk.

FOREST CONSERVATION

Turning to the question of forest conservation Mr. Stewart pointed out that here again Canada found herself at once on common ground with the United States. The forest conservation movement in the Dominion owed its birth and vigour more to the effects of United States experience than to all other factors combined.

The depletion of the timber stands of the Eastern and Lake States had had two outstanding effects. First, in the United States it had awakened the public mind to a state of concern that would not be removed until the management of United States forest resources was placed on a more satisfactory basis, and secondly it had turned upon Canadian forests the full force of market demands that could no longer be met by United States forests alone. Owing to the spur of these United States market requirements, Canada's forest industries had expanded at a remarkable rate and the Dominion in turn found itself compelled to give the most serious attention to the question of conservation.

Mr. Stewart stated that, calculated according to the best information available, Canada's forest resources were being reduced by about eleven billion board feet annually which, if continued, would mean their practical exhaustion in a period of about 100 years. Fortunately the British Empire Forestry Conference which met in Canada last summer did much toward giving a practical lead in defining the basis for an adequate forestry policy.

POWER PLANTS INSTEAD OF FORTS

In touching on the common problems of the two countries in regard to the various questions associated with waterways, Mr. Stewart referred to the great variety of issues dealt with by the International Joint Commission. The formation of this body and the eminently satisfactory manner in which its duties had been discharged during its existence of some fourteen years had naturally caused the International Joint Commission to be regarded as the prize illustration of the amity and goodwill that had marked the relations between the United States and Canada.

However, the joint ownership of certain navigable streams and power sites along the boundary was by no means the sole factor linking Canadian and United States interests in the development of water resources. For instance, United States business men had furnished a considerable share of the new capital that had been required to finance the great progress that had been made in Canada during recent years along the line of harnessing water-power. Much of the capital required for these undertakings had been obtained within the Dominion or the Empire but the bulk of it had been secured from the United States. Futhermore, hydro-electric and kindred development was likely to proceed on a large scale for many years to come and, judging from the course of recent growth, there would be a further need of 600 million dollars of fresh capital in the next ten years. The furnishing of these investment funds constituted one of the very important mutual interests that is ordinarily overlooked owing to the focussing of public attention upon various boundary problems where the international feature crops up more conspicuously.

In this connection the speaker made a point which, from the manner of its reception evidently deeply impressed his hearers. Few citizens of either country, he said, realized that many of the most strategic points along the International Boundary from the Atlantic to the Pacific were occupied not by hostile fortresses, as, alas, would be the case in similar situations in Europe, but by huge hydro-electric plants, erected with the single purpose of advancing the arts of peace and industry in vast tributary areas on both sides of the boundary.

NATIONAL PARKS AND MIGRATORY BIRDS

Mr. Stewart went on to say that Canada owed a distinct debt to the United States in regard to the provision of national parks. The national parks movement was recognized in Canada to-day as being of the utmost national importance, judged by its commercial value alone, and much of the credit for the progress that had been made in this direction could be traced to the influence of United States example and sentiment. At the same time Mr. Stewart remarked that Canada had given something in return, for no stronger hand ever befriended the Parks Administration in the States than that of the late Franklin K. Lane, Canadian by birth, who filled one of the large places in the American public life of his day.

Mr. Stewart expressed satisfaction in being able to point out that the business instinct—the dollar and cents consideration—had not been the sole motive behind the Canadian-American program of conservation. He cited the Migratory Birds Treaty as a tribute to the sportsmanship of the two peoples and as a force for international goodwill and co-operation. By that treaty the two countries had agreed to extend equal protection to the wild bird life which sojourns in the Dominion during the nesting season and in the States during the winter. "The action taken along these lines," said Mr. Stewart, "perhaps does more solid credit to the spirit of our international relations than does the erection of a power plant, the joint protection of a boundary fishery, or any other co-operative business undertaking from which we both reckon on receiving an adequate dividend in one form or another."

(Continued on page 3)

FIRST WORLD POWER CONFERENCE

Objects of Canada's Participation Set Forth by Minister of the Interior—Representative Committee Formed

As the time approaches for the holding of the First World Power Conference—London, June 30 to July 12, 1924—interest in the subject increases throughout the Dominion. This was evidenced by the representative attendance of delegates from every province at a meeting held in Ottawa on December 6, when Hon. Charles Stewart, Minister of the Interior, explained the purposes of the Conference and stressed the necessity for adequate participation by Canada.

The minister declared it to be his belief that when the present situation in Europe had passed, Canada would be facing keen competition from that side of the Atlantic. Power would play a tremendous part in cheap production, and Canada's unique and unrivalled water-powers would be one of the factors which would enable this country to meet overseas competition successfully. "Men, money and markets" were the chief advantages which the Minister expected Canada would secure from participation in the World Power Conference. He hoped that British capital would be attracted to Canada to develop her great water-powers and the resources dependent thereon. He stated that the aim of the Department of the Interior in all water-power matters was, by co-operation with appropriate provincial authorities, to render assistance to any effort which will facilitate the development, distribution, and use of hydro-electric energy and thus advance the general prosperity of the Dominion.

The Director of Water Power of the Department of the Interior, Mr. J. B. Challies, who attended a preliminary international conference in London and Paris in August of representatives of the various participating countries, said that as Canada was already recognized as one of the greatest water-power countries in the world, the Dominion's participation must be adequate to her unique achievements in hydro-electric matters. Great interest was being taken throughout Europe in the progress of Canadian power development, in every aspect of which Canada had to her credit remarkable achievements.

Mr. Challies stated that the objects of the Power Conference were to consider how the industrial and scientific sources of power may be adjusted nationally and internationally: By considering the potential resources of each country in hydro-electric power, oil and minerals; by comparing experiences in the development of scientific agriculture, irrigation and transportation by land, water and air; by conferences of civil, electrical, mechanical, marine, and mining engineers, technical experts and authorities, and by industrial research; by consultation of the consumers of power and the manufacturers of the instruments of production; by conferences on technical education to review the educational methods in different countries, and to consider means by which existing facilities may be improved; by discussions on the financial and economic aspects of industry; by conference on the possibility of establishing a permanent world bureau for the collection of data, the preparation of inventories of the world's resources and the exchange of industrial and scientific information through appointed representatives in the various countries.

MANAGEMENT COMMITTEE

Under the direction of the Minister of the Interior the following permanent Management Committee has been constituted to make final arrangements for Canadian participation:—

Chairman

Charles Camsell, B.Sc., LL.D., F.R.S.C., Deputy Minister, Dept. of Mines, Ottawa.

Vice-Chairmen

H. G. Acres, B.A.Sc., M.E.I.C., M. Am. Soc. C.E., Chief Hydraulic Engineer, Hydro-Electric Power Commission of Ontario.

Arthur Amos, B.A. Sc., C.E., A.M.E.I.C., Director of the Hydraulic Service, Member of the Quebec Streams Commission, Quebec.

John Murphy, B.A., M.E.I.C., F.A.I.E.E., Consulting Electrical Engineer, Dept. of Railways and Canals; and Dom. Railway Commission, Ottawa.

Arthur Surveyer, B.A.Sc., C.E., M.E.I.C., Consulting Engineer, Montreal.

General Secretary

J. B. Challies, C.E., M.E.I.C., M.Am. Soc. C.E., Director Dominion Water Power Branch and Reclamation Service, Dept. of the Interior, Ottawa.

Members

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A. A. Dion, M.E.I.C., F.A.I.E.E., General Manager, Ottawa Electric Co. and Ottawa Gas Co., Ottawa.

R. J. Durley, Ma. E., M. Inst C.E., M. Am. Soc. M.E., M.E.I.C., Sec. Canadian Engineering Standards Association, Ottawa.

J. G. Glassco, M.Sc., M.E.I.C., A.A.I.E.E., Manager, city of Winnipeg Hydro-Electric System.

F. R. Glover, Chief Executive Assistant, British Columbia Electric Railway Co., Vancouver.

A. Monro Grier, K.C., President Canadian Niagara Power Co., Toronto.

B. F. Haanel, B.Sc., M.E.I.C., Chief Engineer, Division of Fuels and Fuel Testing, Dept. of Mines, Ottawa.

O. Higman, M.E.I.C., Director, Electricity and Gas Inspection Branch, Dept. of Trade and Commerce, Ottawa.

Fraser S. Keith, B.Sc., M.E.I.C., Sec. Engineering Institute of Canada, Montreal.

O. O. Lefebvre, B.A.Sc., M.E.I.C., Chief Engineer, Quebec Streams Commission, Montreal.

G. C. Mackenzie, B.Sc., Sec. Canadian Institute of Mining and Metallurgy, Montreal.

Brig. General C. H. Mitchell, C.B., C.M.G., C.E., LL.D., M.E.I.C., M. Am. Soc. C.E., Dean, Faculty of Applied Science and Engineering, University of Toronto.

Julian C. Smith, LL.D., M.E., M.E.I.C., M. Am. Soc. C.E., F.A.I.E.E., Vice-President and General Manager, Shawinigan Water and Power Co., President, Quebec Power Co., etc., Montreal.

K. H. Smith, B.A.Sc., M.E.I.C., Chief Engineer, Nova Scotia Power Commission, Halifax, N.S.

TREE PLANTING ON THE PRAIRIES

Important Part Played by Shelter-belts in Developing the Resources of the Middle West

Why the prairies are treeless is a moot question but the labours and experiments of over twenty years have shown that trees can be made to grow in the prairie region of Canada if a few simple precautions are taken. The value of trees upon prairie farms is threefold. They add to the productivity of the farm, they provide wood material for many uses, and above all they add to the comfort and content of life. The usefulness of tree-belts was recognized by the early settlers but coming as they did from wooded provinces, they did not understand the growing of trees under prairie conditions and most efforts at tree-growing resulted in failure. In 1901, the Tree-Planting Division of the Forestry Branch of the Department of the Interior was established to develop this resource. Starting with a distribution of a few thousand trees the work has steadily grown until now about five million trees are sent out each spring from the Dominion forest nursery stations at Indian Head and Sutherland, Saskatchewan. All told about seventy million trees have been distributed and it is estimated that at least eighty per cent of those planted since 1901 are now growing. This tree-planting work is carried on co-operatively. The Government supplies the seedling trees and sends out inspectors who give expert advice in laying out the ground and in regard to cultivation. The settler furnishes the labour and agrees to maintain the land in trees. The system has worked well and similar action has been taken by several of the provinces and by some United States departments.

A Saskatchewan garden made possible by the shelter-belt seen in the background. The site was originally bare prairie.

As compared with the knowledge available in the early stages of co-operative administration, valuable data now exist on the best method of establishing a wind-break and maintaining its usefulness. Tree planting is therefore on a permanent basis, and no western farm home to-day need be without the trees which are so necessary to make the surroundings more congenial.

Heretofore, most of the groves set out have been with the object of protecting and sheltering the farm buildings. There is, however, a wider scope for tree planting and this is becoming more apparent every year. In certain parts of the West somewhat serious conditions have developed through the drifting of top-soil, and the Forestry Branch is now co-operating with organized movements amongst communities in these areas, to assist in establishing permanent field shelters, as barriers to control the unbroken sweep of the winds. In recent years there has been a noticeable increase in requests from farmers for information and assistance in this respect.

The Department of the Interior last year made a careful survey of results so far attained. As a result of a very conservative estimate based on this survey, it is believed that there are now at least 40,000 vigorously-growing shelter-belts in the Prairie Provinces. Most of the owners estimate the value of each of these belts at $1000 or more, but placing a value of $300 on these 40,000 plantations, it means that the resources of the West have been increased to the extent of $12,000,000. The chief value of a plantation on the prairies however is not its actual worth in cash. Each successful tree-belt is a practical demonstration of the kinds and varieties of trees which can be depended upon in a particular locality. It encourages those who have been too skeptical to do any planting themselves, it relieves the general monotony of the landscape, and lends a greater impression of permanency to farm life. While from the above it is apparent that much has been done in the planting of shelter-belts, nevertheless in proportion to the extent of territory involved no more than a start has been made. It is anticipated that now the principles underlying success in tree-planting are beginning to be understood, the advance of the tree-planting movement will be much more rapid in the future than it has been in the past.

MEASURING BETWEEN TIDES

Everyone who has given any attention to the matter of geodetic surveying knows the necessity for an accurately measured "base line" on which all subsequent measurements are based. The ideal site is a fairly level stretch of open ground, three to ten miles in length, along which the base line may be measured. Failing this the surveyor must clear away obstructing trees, bridge over ravines, and resort to other expedients. Recently the Geodetic Survey of Canada adopted a novel method in running a base line along the seashore in such a position that half the line is under water at high tide. The location is Oyster bay, British Columbia and the rough nature of the land formation left no option as to the place for the line. In spite of the fact that part of the line was under water for several hours every day, the marking posts driven into the sand held well and the measurements made while the tide was out proved entirely satisfactory.

Seven new apples and one new crab apple were originated in the Division of Horticulture of the Department of Agriculture during the year 1922. The new varieties of apples have been named, Bethanis, Keetosh, Maclaw, Newtosh, Spimil, Spiza, and Stontosh, and the McPrince crab.

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Deputy Minister

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In cases where the address is incorrect, or where for any cause the publication is not delivered regularly, a note to the Secretary, stating the circumstances, would be appreciated.

Natural Resources, Canada, is published in French as well as in English, and readers may have whichever edition they prefer.

OTTAWA, JANUARY, 1924

COMMON PROBLEMS REVIEWED

(Continued from page 1)

IMMIGRATION PROBLEMS

Touching very briefly on the subject of immigration, Mr. Stewart assured his audience that Canada had no intention whatever of becoming an anteroom for the illicit introduction of immigrants into the United States. Every precaution was being taken by Canadian immigration authorities to prevent this being done. Moreover Canada had a direct interest in observing the working out of the methods taken by the United States to control immigration and to build up the highest possible standards of citizenship. Canada's interest in this problem was a personal one, because Canadian statesmen realized that the growth of the Dominion during the present century was likely to develop many of the same features that characterized United States growth during the past two or three generations. Mr. Stewart avoided any discussion of the particular phases into which the problem of assimilating millions of persons of alien birth and parentage resolved itself, but he said that Canadian authorities would study the results of United States efforts to deal with this problem as being the most valuable guide for the shaping of Canadian policy along the soundest lines.

During the course of his address Mr. Stewart took occasion to refer to the visit of the late President Harding to Vancouver and to express Canada's profound appreciation of the priceless legacy of goodwill contained in President Harding's speech during that visit. His tragic death, following almost immediately, had brought a sense of sorrow to the Dominion hardly less than to his own country.

QUICK GROWING TREES FOR THE PRAIRIES

Many of the species which can be used on the prairies are very rapid growers, for example, cottonwood, willow, Russian poplar, and Manitoba maple. It is safe to say that wood large enough for fuel can be grown from any of these trees within six years.—Forestry Branch Bulletin No. 1.

AIRCRAFT PROVE A GREAT AID IN SURVEYS WORK

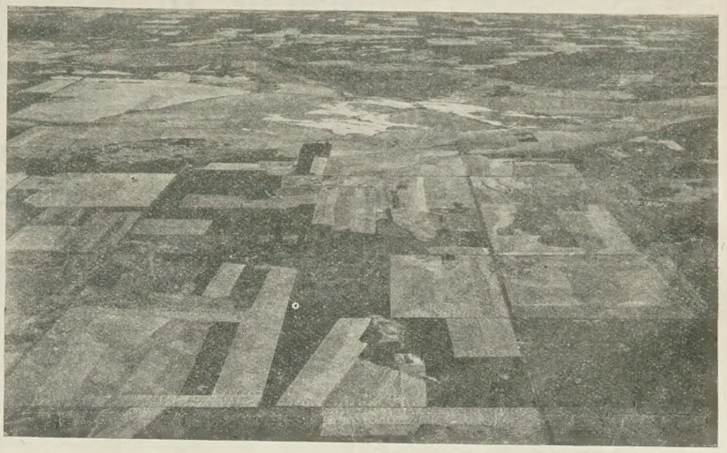
ECONOMY EFFECTED BY NEW METHOD

Successful Application of Aerial Photography to the Mapping of Northwestern Canada

During the season just closed a number of experiments were carried out looking to the utilization of aircraft for supplementing the work of parties employed by the Topographical Survey in western and northwestern Canada. These experiments were conducted by the Royal Air Force of Canada under the direction of Mr. A. M. Narraway, Controller of Surveys, and consisted of the taking of series of vertical and oblique photographs from aircraft flying at predetermined heights, and the use of these photographs as an aid in the plotting of topographical features on the map. Briefly stated, these experiments were entirely successful and indicate the lines upon which the method may be developed.

Operations were first conducted in the area north of Pas, Manitoba, where reliable maps are needed to facilitate the development of the mineral and forest resources in which the district is known to abound. Here countless islands, are separated by rocky ridges covered with almost impenetrable bush. Owing to the mass of detail required and the great difficulties to be overcome in collecting it, the production of an adequate map of such a country by ordinary survey methods is very expensive, and as a result the collection of topographical information has heretofore been restricted to the limits of the main connected waterways.

A survey party had been sent into this area in the spring to establish a through traverse line along the main waterways extending from Athapapaskow lake to the Churchill river, as well as throughout the mineralized area to the east. In anticipation of the aerial photographic work to be undertaken, the party was instructed to note carefully the stations occupied so as to be able to identify these points on the photographs. The party was followed later in the season by a seaplane carrying a pilot, an engineer, and a photographer with suitable emergency rations to provide against forced landings. The plane carried an aerial camera mounted over the nose and made flights at a height of about 4000 feet over the course followed by the survey party.



Aerial view, taken from an altitude of 4,800 feet, of the settled country west of Red Deer, Alberta, showing natural grid furnished by Dominion Lands survey system.

Oblique photographs were taken at intervals of about three miles so that each picture would show in the foreground the terrain shown in the background of the preceding one. In addition to these, other photographs were taken in a systematic manner at right angles to the line of flight. In this way photographs were obtained of a strip of country stretching for over five miles on each side of the line of traverse.

Subsequently when the photographs had been developed and collated a grid system was laid down on them based upon the points of the survey, and corresponding to a system of squares on a plan, thus enabling the various topographical features to be plotted. The lower illustration shows this system and also the general character of the terrain. Upwards of seven hundred views were obtained. These are now being plotted and the resulting maps will be the most complete ever issued of any district in the North.

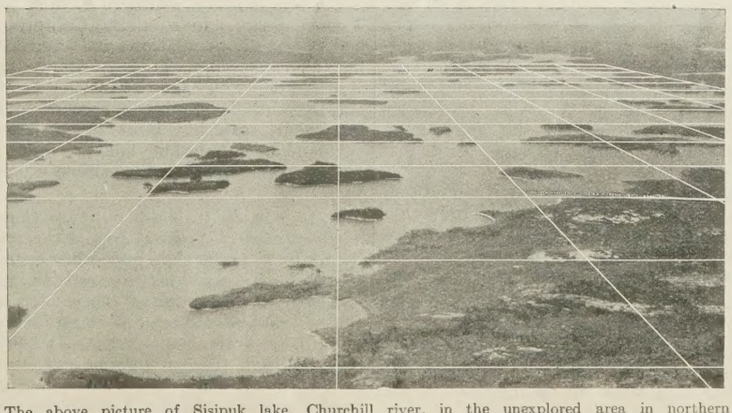
The next series of experiments was carried out in the settled areas in the vicinity of Red Deer and Edmonton, Alberta, where topographical maps were being made by the ordinary field methods. Oblique photographs were taken at various altitudes from five thousand to ten thousand feet. The upper illustration is made from one of the photographs taken during these trials and shows the wealth of detail which is made available to the map maker. The views in this instance were taken from a land machine belonging to the High River station, with an aerial camera mounted in the tail and looking out at right angles to the line of flight. The views overlap along the sides. It will be noticed that the section lines of the Dominion Lands system are clearly discernible in the photograph.

A further series of experiments was conducted in the Edmonton district, in conjunction with the surveys for the classification of lands for settlement. This work requires the use of accurate maps showing the roads and trails, areas covered by bush, swamps, hay meadows, and other natural features. Mapping by ordinary methods is necessarily slow, whereas, since the country suitable for settlement has already been laid out in sections and quarter sections, and as the surveyed lines and roads are nearly all visible from the air, all features may be mapped without further ground control.

RESULTS AND CONCLUSIONS

The experiments above described indicate great possibilities. In Western Canada the Dominion Lands survey forms an excellent natural system for scaling photographs and outline maps can be filled in at a reasonable cost. In the unsettled North, the country is similar to the area near Pas and it is only reasonable to expect that the same success which attended the experiments there will be attained when the method is applied on a larger scale. Results indicate that it is possible to go into an area previously unmapped and by means of aerial photography and a comparatively small amount of ground work to map even the most intricate waterways. A greater distance can be covered in the season with considerable saving in cost

There can be no doubt that aircraft and aerial photography by rendering possible the economical production of topographical maps will play a large part in opening up our immense hinterland to the geologist, the prospector, and to all interested in the development of our resources.



The above picture of Sisipuk lake, Churchill river, in the unexplored area in northern Manitoba, was taken from a sea-plane and gives an idea of the aid of flying machines to the surveyor, prospector, and traveller. The photograph is gridded ready for plotting.

FIRE-PROOFING WOOD

Wood is such a convenient material, on account of the ease with which it is worked, its relative strength, its low cost, and attractive appearance that if it could be rendered fire-proof it would be almost ideal for many purposes. The Forest Products Laboratories of the Forestry Branch, Department of the Interior, are investigating various processes for rendering wood resistant to fire. The Laboratories point out that it is possible, by impregnation with certain salts, to render wood fire-retardant, that is to decrease its natural inflammability very considerably. It can thus be made extremely difficult to ignite and the persistence of glowing embers can be prevented. This is an important step in the desired direction and in view of the progress already made, it is hoped that the processes may be made even more efficient.

Laboratory service for seed testing is provided for at five points in Canada by the Department of Agriculture, namely, Calgary, Winnipeg, Toronto, Ottawa, and Quebec.

CURRENT REPORTS

"'Canada's Arctic Islands'—Log of Canadian Expedition 1922", by J. D. Craig, B.Sc., D.L.S., M.E.I.C., issued by the North West Territories and Yukon Branch of the Department of the Interior.

Each year brings increased interest in Canada's northern possessions, and not least in our Arctic archipelago, with which are associated the names of Sir John Franklin and other great navigators of bygone days. The Government of Canada is extending the range of its administrative work in the North and the report above referred to presents in narrative form the objects and accomplishments of the 1922 Expedition to the District of Franklin, which embraces all the islands of the Canadian Arctic archipelago.

The expedition was organized by the Department of the Interior through the North West Territories and Yukon Branch.

The author, who was in charge of the expedition, begins his report with a review of the potentialities of these little known areas and states what is being done by the Government to provide for their more detailed administration.

The organization of the party and the selection of the scientific personnel is touched upon; the preparations incidental to lading and provisioning the ship, and the final start for the North are graphically described; and the experiences of the ship's party in threading a way through the ice fields, between Baffin island and Greenland, add colour to the routine of a northern voyage.

Bylot island was reached after nearly a month out from Quebec, but the supplies intended for Ponds Inlet, where a sergeant of the Royal Canadian Mounted Police had been located for a year on administrative duties, could not be landed until the return journey. Proceeding north a new post was located after considerable difficulty at Craig Harbour on the southern end of Ellesmere island. The operations during the eight days allotted to the construction of administrative quarters and a storehouse, on a protected and carefully chosen site, and the equipping and provisioning of the post for two years are recalled as a time of "feverish haste and unceasing work". The harbour itself was found to be shallow, with strong tides, and the landing of supplies was only possible at or near high water and not always without danger to the landing parties.

The scientific work performed included the making of plane-table and photographic surveys of the harbour and its vicinity; the maintenance of wireless communication with the outside world; the recording of astronomical observations; the recording of data on the aeronautical possibilities and the biological aspects of the northern lands.

Observations showed the location of the new post to be latitude 76° 10″ north and longitude 81° 20″ west of Greenwich. This outpost of Canadian civilization, comprising a post office (probably the most northern "all the year" post office in the world), a customs house, and a police post is thus located only slightly more than eight hundred miles from the pole. Wild life, diverse and relatively plentiful, is described but the vegetation is sparse and consists only of a limited growth, of moss and heather, in favoured localities.

An appendix written by Major R. A. Logan, of the Department of National Defence, who through the co-operation of the Air Board accompanied the expedition, describes the possibility of using aircraft in the North. Many sites in the archipelago are reported upon as being favourable for the location of aerodromes and landing places. The meteorological conditions are said to be ideal for aviation patrol and survey work during June, July, and August when there is continuous daylight.

The report is illustrated by carefully selected photographs and contains a map of the North West Territories on a scale of 100 miles to the inch.

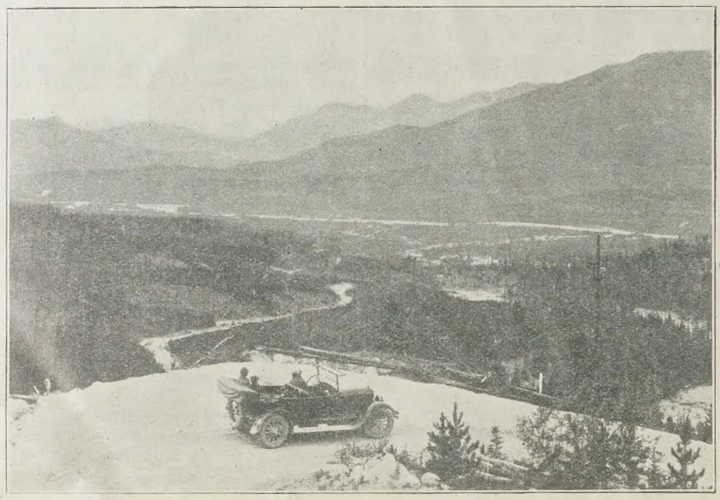
Persons interested may obtain copies upon application to the Director of the North West Territories and Yukon Branch, Department of the Interior, Ottawa.

VALUE OF OUR SCENIC RESOURCES

National Parks Continue to Prove Powerful Magnets for Tourist Travel—Direct and Indirect Benefits

During the past season it was again proved that national parks provide powerful magnets for tourist travel from other countries. It is becoming increasingly clear that while the primary purpose of national parks is not commercial, they are proving each year more and more profitable investments. The national parks were set aside to preserve some of our most beautiful and outstanding scenic regions and to provide recreational areas for the people. Yet because the desire to travel and to see the wonders of other parts of the globe is an almost universal one, the world is making a path to their gates and incidentally bringing many direct and indirect benefits. During the past season practically every one of the parks showed an increase in travel. Jasper park, which was able for the first time to offer suitable accommodation had at times more visitors than it could comfortably accommodate and a large addition to its bungalow hotel will be made for next year. Reports of its beautiful scenery were the cause of bringing many hundreds of people to Canada from the United States. In spite of a wet season and other drawbacks over 3,000 cars entered Banff and Kootenay parks from the United States. None of these visitors spent less than five days in Canada, many of them spent considerably more and a large number declared their intention of returning next year for a long holiday among the mountains.

The growth in travel, however, is not confined to the national parks. A similar increase in visitors was reported from many parts of the Dominion, particularly from those provinces which have undertaken special publicity and good roads campaigns. According to reports recently published in the daily press the annual tourist revenue of British Columbia has now reached the astonishing total of $36,000,000 or a sum equal to the total annual mineral production of that province. The revenue of Ontario from this source has not been computed but it must reach a large sum, while in Quebec, due largely to improved highways, travel last year, according to the Minister of Roads, was worth $20,000,000 and included 125,000 cars. In spite of a cool season there was also a large travel to the Maritime Provinces, New Brunswick reporting a total of about $4,000,000 or nearly three times that of two years ago. It must be remembered, too, that the revenue from tourists is widely distributed among all classes of people and helps to build up the prosperity of both town and country. Figures carefully worked out by publicity experts indicate that out of every dollar spent by the tourist approximately one-third goes for food and ultimately finds its way into the pockets of the people in the rural districts.



On the new Edith Cavell motor highway in Jasper national park, looking over the valley of the Athabaska toward the Maligne range.

This peaceful penetration of Canada by people from the south of the line for holiday purposes is also beneficial in other ways, because it is building up goodwill and a better understanding. Travel in a country dispels many erroneous impressions and reveals unsuspected national possibilities. It is undoubtedly true that Canada beyond her own borders is still often regarded as a trackless forest, roamed over by bears, moose, and Indians, where the inhabitants live under Arctic conditions the greater part of the year. A summer holiday in Canada is therefore educational in the best sense and serves often as a preliminary to investment or permanent settlement. The best example of how immigration follows tourist travel is perhaps found in southern California. Twenty years ago southern California had a small population and a very limited prosperity. To-day, simply as a result of capitalizing her scenery and climate and developing her roads and attractions, she has built up a large permanent population and a tourist travel worth, it is said, $300,000,000 a year.

In proportion to her population Canada possesses a greater area set aside for national parks than any other country and she can look forward to an increasing appreciation of their attractions. She possesses, to, many other potentialities which as yet have scarcely been realized. In her summer and even her winter climate, her virgin forests, her big game and fishing, her picturesque Indian and French Canadian traditions, her beautiful cities and rural districts, and her great hinterland of wilderness, she possesses a wealth of natural attractions capable of practically unlimited development.

The different lines of work carried on by the Department of the Interior in the preservation of places of national interest such as historic and prehistoric sites, the protection of old arts and handicrafts, the creation of bird sanctuaries, and the preservation of many forms of bird and animal life, are all serving to make Canada an increasingly interesting place to live in and, therefore, to enhance its attractions for tourists. The possibilities in this connection have as yet scarcely been realized but they can undoubtedly be made to play a large part in building up the prosperity of the country.

FORESTRY CONFERENCE ON FIRE PROTECTION

Federal and Provincial Ministers and Forestry Officers will meet in Ottawa

Upon the invitation extended on behalf of the Dominion Government by Hon. Charles Stewart, Minister of the Interior, the ministers of the various provincial governments who are charged with forest administration will gather in a conference at Ottawa in January to discuss the problem of forest fire protection. The provincial ministers will be accompanied by the officers in charge of the forest services. Federal forestry officers will participate and the whole problem will be discussed in its widest aspects.

The Dominion Government is interested primarily in the forests on federal lands in Western Canada but by virtue of its national responsibility it was instrumental in having the meeting of the British Empire Forestry Conference held in Canada in the past autumn. Canadian forestry officers, federal and provincial, participated in the work of the Conference, which as a result of its investigations, decided that the most urgent forestry problem was that of fire control. It is in following up the line of action thus indicated that the gathering in Ottawa this month is convoked.

EXPERIMENTAL FORESTRY

Experimental silvicultural work is being conducted by the Dominion Forest Service at its forest experiment stations in order to determine the results of different methods of growth, thinning and cutting. Both coniferous and hardwood stands are under investigation and different methods such as clear and selection cutting, thinning, removal of undesirable species, etc., are being fully tested with the object of ascertaining how best to secure good reproduction and rapid growth.

DISCOVER NEW FISHING BANK

It is reported by the Department of Marine and Fisheries that a new fishing bank, approximately 200 miles in length and 90 miles in width, has been discovered off the coast of Labrador. This fishing ground, which, it is stated, abounds in cod and halibut, will likely prove a valuable acquisition to the already known fishing banks. The depth of the water is 76 fathoms, and the same soundings, varying but little, prevailed over a large part of the bank.

ONTARIO FISHERIES RESEARCH LABORATORY

NATURAL RESOURCES CANADA

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FORT CHAMBLY A RELIC OF EARLY CANADIAN HISTORY

MEMORABLE RUINS NEAR MONTREAL

Department of the Interior Engaged in the Preservation of Historic Remains

Fort Chambly, situated twenty miles southeast of Montreal on a conspicuous headland of the Richelieu river, stands out as one of the most notable and picturesque ruins in Canada. Its importance as a valuable historical memorial of the early military period of the Dominion resulted, in 1921, in its being placed under the care of the Department of the Interior to be preserved for the benefit of future generations. Steps have been taken to arrest the disintegration of the massive walls and otherwise adequately protect the fort. A museum containing a valuable collection of rare books, photographs, and relics has been added to the fort. That the public is greatly interested in the site is shown by the fact that in the last year it was visited by over 6,000 people.

The history of Fort Chambly goes back more than two and a half centuries to the year 1665 in which New France received its first substantial assistance from the mother country in combating the attacks of the hostile Iroquois. The first fort was erected of wood by Jacques de Chambly, a captain of the Carignan regiment, as one of a string of forts including Sorel and Ste. Therese. It was built in the form of a square, 144 feet on each side with palisades fifteen feet high. Inside the walls were erected barracks, a chapel, and a house for the commandant. Seven years later the fort was temporarily abandoned and the Indians seized the opportunity to commit it to the flames. It was partially destroyed but was shortly afterwards rebuilt though on a smaller scale.

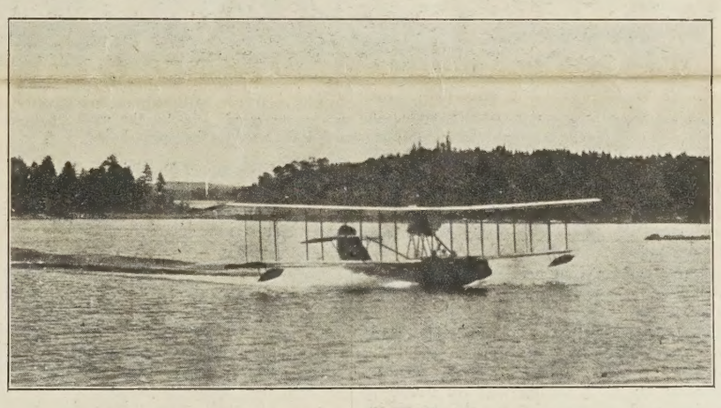
It was in 1709 that the construction of the solid structure, whose crumbling walls remain to-day, was begun. The fall of 1711 saw its completion and for the next twenty-three years the new Fort Chambly was one of the important military posts of the colony. Rumours of war with England necessitated repairs being made in 1740. The struggle lasted twenty years and in 1760 the fort was surrendered to the English forces. It remained in the hands of the British until taken by the Americans in 1775, the latter forces evacuating the fort in the following year, after burning everything combustible. It was put in a state of repair in 1777 by Governor Carleton,

Continued on page 4

FOREST PROTECTION CONFERENCE

Lines of Action Decided on at Meetings of Federal and Provincial Forestry Officers

In accordance with the announcement made last month an important conference of federal and provincial forest officers, convoked by Hon. Charles Stewart, Minister of the Interior, was held in Ottawa, January 7 to 11 inclusive, when the vital question of forest fire protection was discussed in all its bearings. The meetings were held in the Railway Committee room of the House of Commons and the delegates, whose names will be found below, were representative of all parts of Canada from Atlantic to Pacific.



Forest Fire Protection—Seaplane taking off for the patrol in early morning, Victoria Beach, lake Winnipeg, Manitoba.—Air Board photo.

The proceedings were opened by Hon. Charles Stewart in an address which struck the keynote of the conference. He said the object of the gathering was conservation, and, as a means to that end, he was prepared to recommend that a reasonable amount of federal assistance be given to the provinces if that should be deemed necessary and advisable. He made it clear that there was no intention of interfering with the rights and privileges of the provinces. Later in the proceedings Mr. Stewart intimated that the preferred way of giving assistance would be by the strengthening of the aircraft service, and making arrangements for its use by the provincial authorities.

The different subjects were keenly discussed during the five days of the meeting and while there were many different points of view the decisions finally reached received the support of practically all the delegates. The findings of the conference were embodied in the following resolutions:—

RESOLUTIONS

(1) Whereas forest fire protection has become a highly specialized problem requiring trained personnel for efficiency, Resolved that in the opinion of this Conference there is urgent need for the establishment of instructional courses for service personnel immediately subsequent to their assignment for duty.

(2) Whereas agriculture and forestry are not opposed but supplementary, agriculture requiring the better lands and forestry those incapable of agricultural development, and Whereas the fire hazard resulting from uncontrolled settlement in forest regions has proved a great menace to our timber supplies, Resolved that in the opinion of this Conference there is urgent need for the development of definite policies looking to the direction of settlement to lands which are of bona fide value for agricultural purposes; such settlement should proceed step by step to allow for proper development of community facilities.

(3) Whereas the proper direction of settlement can only be based on thorough land classification, Resolved that this Conference records its conviction that land classification should precede settlement.

(4) Whereas the maintenance of forest cover in certain parts of each watershed is essential for the regulation of stream-flow, and Whereas the permanent retention of absolute forest lands for continuous timber production is fundamental to a proper forest policy, and is also essential to efficient fire protection, Resolved that in the opinion of this Conference all lands found by proper land classification to be suitable only for forest purposes, either for timber production or watershed protection, should be set aside in permanent national or provincial forests.

Continued on page 4

PRE-EMINENCE OF OUR SEED SHOWN IN COMPETITION*

CANADIAN GROWERS WIN MANY PRIZES

Dominion Exhibitors at International Show Score Successes in Majority of Grains

By the many championships and prizes won by Canadian seed growers at the International Hay and Grain Show recently held at Chicago, the evidence of former exhibitions as to Canada's pre-eminence as a producer of high-class seed is confirmed. In Europe it is the rule to look to the north for the seed with which to maintain and increase the production of the fields of the central and southern parts of the continent and the same tendency is becoming marked on this side of the Atlantic. Canadian growers produce these seeds in large quantities, so that their ability to supply the demands which come from the more southern parts of this continent is a fact of great economic importance to those parts as well as to the Dominion. In wheat her leadership has long been acknowledged and of late years this has been extended to other grains, while in corn, which was long supposed to be a southern product, her advance in the last few years has been remarkable.

In the exhibition just held, in the class of hard red spring wheat, open to all of North America, Canada succeeded in a field of 91 in winning 15 out of 25 prizes, including the grand championship, which went to Alberta, with the Marquis variety. The second prize for hard wheat went to a Montana grower, who had obtained his seed from Indian Head, Saskatchewan. At least the first three prize-winning samples of wheat at the International Hay and Grain Show since its inception in 1919 have been obtained with the Marquis variety. As in 1922, Alberta also won against all North America the championship for white oats. In the regional contest Canadian growers took 28 out of 35 prizes for oats raised in Region 1 which takes in most of the oat producing districts west of Chicago. Only three exhibits from Canada competed in the white field pea division and they stood first, third and fourth. Saskatchewan seed captured first prize for barley in the two-rowed class, second prize in the six-rowed and Canadian seed took third, fifth and tenth prizes in the Trebi six-rowed barley class. Among other win-

**Prepared under the direction of Dr. J. H. Grisdale, Deputy Minister of Agriculture, by Mr. L. H. Newman, Dominion Cerealist.*

Continued on page 3

CANADA'S MAPLE SUGAR INDUSTRY

Production of this Delicacy Holds Place of Prominence in Eastern and Maritime Provinces

One of the oldest industries in Canada and one which is truly Canadian in its origin is that producing maple sugar. Early settlers from the Old Land were taught how to extract and concentrate the sap of the maple tree by the Indians and for perhaps a century they followed closely the primitive methods of the natives save for the substitution of metal vessels for those of clay or wood. Until about fifty years ago there was little improvement made in the methods of sugar makers; but since that time the advance has kept pace with that in other branches of agriculture until it has become a more or less highly organized commercial industry.

The importance of the maple sugar industry is scarcely realized in parts of Canada where it has long since ceased to be carried on but it still holds a place of prominence over large areas in Quebec and to a lesser extent in Ontario, New Brunswick, and Nova Scotia. It is estimated that 50,000 growers are engaged in the work. From 1850 to 1890, the production of maple sugar together with its equivalent in syrup, increased year by year, reaching an average annual yield of 22,500,000 pounds during the ten years between 1881 and 1891. During the next decade the yearly average fell to some 21,200,000 pounds and in more recent years it has dropped to less than 20,000,000 pounds.

On many farms the sugar bush is simply the woodlot that has been preserved to supply fuel and to provide an annual crop of sugar and syrup to be used as a delicacy or sold to regular customers. It is not, however, from these small mixed groves that the great marketable supply is secured but rather from the more rugged areas where the plough and the harvester are not so easily operated. The groves as found in the principal sugar counties are chiefly maple trees, the other kinds having been removed for fuel or the saw. This is the condition in many of the settled counties of eastern Ontario and of Quebec, where the same groves and in many cases the same trees have been tapped by several generations. In the more northerly parts of these provinces there are vast stretches of chiefly hard maple forest in a primeval state awaiting the sugar-maker with his modern equipment.

The methods of garnering this annual harvest have changed considerably since the days when the Indian extracted the sap from a slanting gash in the tree made with his tomahawk, boiling it in an earthen vessel until a small quantity of dark, thick syrup had been produced. The first steps were the substitution of the auger for the axe, coopered pails for the birch bark "caso" or hewn sap trough, and the evaporating pan for the kettle. The evaporating pan has in recent years been developed into the modern evaporator with corrugated bottom and separate compartments. Not only for the conservation of the life of the tree but also for cleanliness in sugar making the wooden spout has almost disappeared in the most advanced sections. In fact the tendency now is toward the use of metal in every article of equipment with which the sap, syrup or sugar comes in contact.

Facilities are also provided for taking full advantage of the law of gravitation in the handling of sap, which in some well equipped plants flows of its own accord from the collecting tanks to the storage tank then to the evaporator and finally when boiled to the proper consistency, into the receiving cans, thus saving a great amount of labour. Where a grove is located on a hillside some sugar makers have taken further advantage of the law of gravitation by laying a system of metal pipes which conveys the sap from outlying points to the sugar house. The pipes are erected temporarily on supports during the sugaring season and taken down and carefully stored for the remainder of the year.

Canada's Maple Sugar Industry—Gathering the sap of the maple tree by the most up-to-date methods. The system of pipes carries the sap to the sugar-house.

The majestic maple has been cut away to a great extent for the fireplace and the factory. A proper realization of the value of the maple grove or forest not only as a producer of lumber and fuel but for the annual crop of sugar it yields will do much to revive and extend the maple sugar industry. Even though a decrease in production is being experienced the industry still bulks large and with the more general use of modern methods and proper encouragement there is no reason why it should not return to and even surpass its previous records.

JACK PINE A COMING WOOD

Jack pine, formerly despised, is now recognized as a most useful wood. It is used in immense quantities for railway ties, being, in fact, the leading tie timber of Eastern Canada. It is also being used in increasing quantities for lumber. Jack pine is frequently attacked by a fungal disease, which, in the earlier stages of its development, causes a reddish discolouration often referred to as "red stain". The Forest Products Laboratories of the Forestry Branch of the Department of the Interior recently made a series of experiments to determine the effect of "red stain" on the strength of the timber. The results of these tests show that no diminution of the strength results from this condition and where the appearance of the wood is not important there should be no hesitation in employing it.

**Prepared under the direction of Dr. J. H. Grisdale, Deputy Minister of Agriculture, by Mr. J. B. Spencer, B.S.A., Director of Publicity.*

THE OIL SITUATION IN CANADA*

Record of Development Work to Date in Ontario, Alberta and Mackenzie District Fields

During recent years active drilling operations for oil have been carried on in many parts of Canada both in well established oil territory and in new prospective fields. Among these may be mentioned the producing fields of New Brunswick, the southwestern peninsula of Ontario and the Sheep Creek field of Alberta as well as exploration in the Prairie Provinces, British Columbia, and in the Mackenzie River district, N.W.T. Recent developments concern particularly Ontario, Alberta, and the Mackenzie district.

Ontario.—The oil fields of the southwestern peninsula of Ontario date back to the early days of the oil industry in America. Of late years the production has as a whole shown a gradual decline with sporadic increases as new fields opened up. Late in the summer of 1923 a new oil well was "brought in" in Romney tp., Kent county, the well being 3,560 feet deep and having an estimated initial producing capacity of two hundred barrels per day. The producing horizon or rock is what is known as the Trenton formation. Some previous drilling has been done in Ontario to test this formation and from it is derived the oil produced from the Dover West field. Most of the oil production in Ontario, however, is from shallower wells from rocks of a younger age so that this recent discovery opens up new possibilities in the Ontario fields. The Lima-Indiana oil field of Ohio and Indiana, U.S., which has been under development for almost half a century and is now approaching exhaustion, has had a good record of production from the Trenton formation.

Alberta.—Active drilling operations were carried on during 1923 near the International Boundary in Alberta, just north of the producing Kevin-Sunburst field of Montana. Two wells found showings of oil and active drilling is proceeding. No commercial wells have yet been reported. In the Kevin-Sunburst field the rocks are bowed up into a low dome from which the rock beds slope downwards in all directions. It is believed that the oil has migrated upwards along this slope in certain porous beds or "sands" until it has accumulated at the top of the dome-like structure, and as the Canadian area being tested is about nineteen miles distant from the Kevin-Sunburst dome no oil would be expected if the rocks had a uniform slope. It is known, however, that such a uniform slope does not exist but there are minor flexures or warpings on the main dome structure and these are as effective in arresting the oil in its migration up the slope as the main dome itself. It is on some of these subsidiary structures that wells are being drilled in Alberta close to the International Boundary. Since over the area as a whole the slope is downwards away from the main dome, it will be again obvious that the sands that produce oil in the Kevin-Sunburst field will be deeper below the surface in Canada and consequently deeper wells must be undertaken to reach them.

Further north in Alberta, British Petroleums Ltd., in November "brought in" a well near Wainwright 120 miles east of the city of Edmonton. The depth of this well is 2,036 feet, the oil being of a heavy quality. The well probably has an initial capacity of 60 to 100 barrels per day but has not yet been thoroughly tested. Several gas producing areas are located in this part of Alberta and the results from past drillings are encouraging for further exploration.

Mackenzie River District, N.W.T.—In the Norman area the Discovery well of the Imperial Oil Company Ltd., "brought in" in 1920 was slightly deepened in 1923, an increase in flow now estimated at 100 barrels per day being secured. Two other wells were completed in 1923, one of which had a small showing of oil of no commercial value. The Mackenzie River district is far removed from railroad facilities although three companies operate steamers during the summer months on the Mackenzie as far north as the delta of the river where it enters the Arctic ocean. The possible oil fields in this area may, therefore, be considered of future rather than of immediate commercial importance.

MYSTERIOUS BIRD-BANDS

Strange bird-bands, without any marks of identification, are being received by officers of the Canadian National Parks Branch, Department of the Interior, in charge of the Canadian Bird-Banding Records. Sportsmen and others interested in the investigations being carried on by the branch concerning the migrations of wild fowl frequently send in these odd bands. Recently a plain band, without discernible inscription, was taken from a Junco killed at Gannet Rock lighthouse and forwarded to the branch. A swan of an unknown species was shot one hundred miles northeast of Good Hope, on the Mackenzie river, N.W.T., and a band made of fourteen-gauge copper wire removed from its leg. It is hoped that any person having information concerning these birds or any others marked anonymously and bird-bands in general will communicate with this branch. The use of bands of a character which cannot be traced is deprecated as liable to cause confusion in recording migrations. Official bands are available to those who wish to engage in this work and may be had on application to the Commissioner, Canadian National Parks, Ottawa.

There are 147 peaks over 10,000 feet high in the Canadian Rockies, nearly all of them possessing glaciers.

**Prepared under the direction of Dr. Charles Camsell, Deputy Minister of Mines by Dr. G. S. Hume.*

NATURAL RESOURCES CANADA

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Natural Resources, Canada, is published in French as well as in English and readers may have whichever edition they prefer.

OTTAWA, FEBRUARY, 1924

The late Dr. Otto Klotz

By the death of Dr. Otto Klotz on December 28, 1923, the Department of the Interior lost one of its oldest and most faithful servants and Canada one of her foremost scientific men. He had been connected with the departmen since 1879, in increasingly responsible positions as time went on; for the last six years he had occupied with credit the post of Director of the Dominion Observatory.

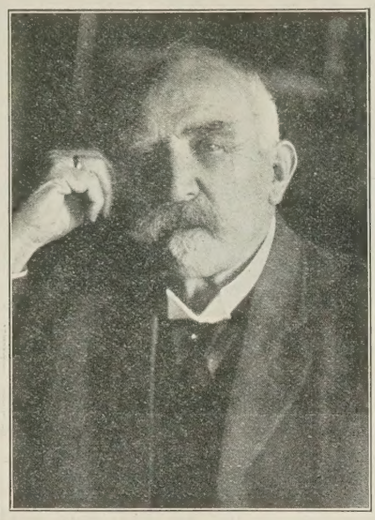
Born in the village of Preston, Upper Canada, on March 31, 1852, he received his early education in the public school of the village and the grammar school of the neighbouring town of Galt, matriculating to Toronto University in 1869. After spending one session there he proceeded to the University of Michigan, Ann Arbor, whence he graduated in 1872.

Returning to Canada he took up work in his chosen profession as surveyor and engineer, and on December 4, 1873, married Marie Widenmann, daughter of the German Consul at Ann Arbor. In November, 1877, he successfully tried the D.T.S. examination, and two years later entered on survey work in the Northwest for the Department of the Interior. In 1887 he was appointed to the D.L.S. board of examiners, a position which he held till his death.

His work as an astronomer began in 1885, in connection with the survey of the Railway Belt in British Columbia, and he was the first one to whom the title of astronomer was officially given by the department. That year marked the inception of latitude and longitude work in Canada, the extension and gradual growth of which culminated twenty years later in the Dominion Observatory.

In 1902 and 1903 he was in charge of a longitude campaign to connect Canada and Australia and thus complete the first longitude chain completely circling the earth. This was successfully carried to a conclusion, the chain closing to within one second of arc.

Shortly after the opening of the Dominion Observatory in 1905 he was appointed Assistant Chief Astronomer, and took charge of the department of geophysics. His own personal attention was devoted to seismology, and during the next twelve years he built



The late Dr. Klotz, from a recent photograph.

up a Canadian seismological station of the first rank, with a reputation surpassed by few if any in the world, which remains one of the enduring monuments to his memory. He is perhaps most widely known by the seismological tables issued by him in 1916. On four occasions, in 1907, 1909, 1911, and 1914, he was Canadian delegate to international seismological conventions in Europe.

On the death of Dr. King, Director of the Observatory, and on Dr. Klotz's subsequent appointment in 1917 to the vacant post, he gave up in large measure his personal seismological work and devoted himself to the oversight of the wider problems of observatory work as a whole. In 1920 he was elected chairman of the newly constituted Canadian National Committee of the International Astronomical Union, and in 1922 was selected as Canadian delegate to the meeting of that organization at Rome.

This last European trip told heavily upon his strength, and a few months after his return he was confined to his house; during the summer of 1923 he rallied and again took up his regular duties for a time; progressively failing health, however, would not be denied, and in October he was again confined to his house, on this occasion for the last time.

Between 1882 and 1922 he published ninety-nine papers, covering astronomy, seismology, and other geophysical subjects. He was a member of many learned societies, among the more important being the Royal Astronomical Society of England; the Royal Society of Canada, of which he was president of Section III in 1922; the Royal Astronomical Society of Canada; the New Zealand Institute; the Seismological Society of America; and many others. His reputation as a scientist extended throughout the world. At the Rome meeting of the International Union of Astronomy, he was placed on most of the committees; everybody wanted his advice and guidance.

Pre-Eminence of our Seed shown in Competition

(*Continued from page 1*)

nings were, first prize for red clover seed, second for sweet clover, second for rye. Canada again forged forward in the matter of corn. The first eight prizes and the eleventh and thirteenth for Flint corn, all went to samples grown in southwestern Ontario. The exhibit of ears of perfectly matured corn made by the Provincial Department of Agriculture of Alberta was also a revelation to the thousands of United States visitors to the show who have been under the impression that western Canada was beyond the northern limit of the corn growing area.

PEAT FUEL FOR CENTRAL CANADA

Successful Government Experiments Result in Private Capital Undertaking its Manufacture for Next Autumn

The possibility of making use of our peat bogs as a source of fuel supply for those parts of Canada which have no coal measures has been frequently suggested. The Dominion Government, in conjunction with the government of the province of Ontario, through the Joint Peat Committee took the matter up and for the past five years has carried out extensive experiments at Alfred, Ontario, about forty-two miles east of Ottawa, which village is located near an immense peat bog. During the course of the experiments, in order to test the quality of the fuel produced, considerable quantities were disposed of in nearby districts in both Ontario and Quebec. The fuel was favourably received and many times the total production could have been sold. It was always made clear, however, that it was not the intention of the governments concerned to go into the fuel business but that the plan was to develop the best methods of manufacture and types of machinery, and to ascertain the cost of production so that private individuals or companies might see the possibilities and be led to undertake the business as an ordinary commercial enterprise.

In accordance with the policy as outlined above, the Hon. Charles Stewart, Minister of the Interior and of Mines, announced on the threshold of the new year, that private capital had become interested in the peat industry and that if present plans matured, consumers in Ontario and Quebec would, next autumn, be able to purchase this fuel. Arrangements have been made with Peat Fuels Limited, a company formed by Kennedy Stinson, President of the Stinson-Reeb Builders Supply Co. of Montreal, and Ernest V. Moore, consulting engineer, who was engineer for the Peat Committee, to take over the plant at Alfred, remodel it in accordance with the design recommended by the Committee and operate it as a commercial proposition. The company has given security for raising sufficient capital to carry out the undertaking and has made agreements to purchase 326 acres of peat deposits at Alfred.

The chief advantages from the manufacture of peat fuel will accrue to Ontario and Quebec, the portion of Canada which needs substitutes for anthracite most. The total area in Canada overlain by peat bogs is estimated at 37,000 square miles of which the central provinces of Ontario, Quebec, New Brunswick, and Manitoba have 12,000 square miles of an average depth of six feet, capable of producing 9,300 million tons of peat fuel equal in heating values to 5,400 million tons of coal.

The Department of Mines has investigated and mapped 46 bogs in Ontario, 27 in Quebec, 7 in Manitoba, and 27 in the Maritime Provinces, comprising in all 228,000 acres. Seven bogs within shipping distance of Toronto are estimated to be capable of producing 26,500,000 tons, seven near Montreal, 23,500,000 tons, and five in the vicinity of Quebec city, 16,250,000 tons of peat fuel.

While in Europe last summer, Dr. Charles Camsell, Deputy Minister of Mines, investigated thoroughly the latest approved methods of making peat fuel and reported that it was the concensus of opinion that the air-drying method utilized at Alfred was the only practical one and that European authorities were agreed that it was impossible to extract the moisture from the raw peat by the use of heat or pressure, at a reasonable cost. The British Fuel Research Board were of the opinion that the mechanical methods used at Alfred were an improvement over any methods used in Europe.

PRECISE LEVELLING IN WINTER

Cost of Running Line Reduced by Water Transfers—Accuracy Maintained

The value of precise levels in opening up the resources of the country is seen when one considers our water-power development as well as the situation in regard to irrigation and drainage work, railway building, etc. In conducting levelling operations overland from point to point it often happens that considerable economy can be effected with but slight sacrifice of accuracy by utilizing the surface of bodies of water at rest to transfer the levels, thus saving the time necessary to run instrumental levels along the shore line.

In levelling operations of high precision the practice of making water transfers across bodies of open water is not looked upon with favour, but the experience of the Geodetic Survey of Canada in the winter of 1922-23 shows that under the protection of ice cover an excellent degree of accuracy may be attained. In the instance cited precise levels were being carried down the course of the Winnipeg river and when lac Seul, an enlargement of the river, was reached a water transfer under ice cover was made from one end to the other, a distance of some sixty miles. Proof of the accuracy of this transfer was obtained by the closure (linking up) of the river levelling on a standard precise level line carried along a railway track some time previously, this closure being well within the limits of accuracy usually obtained in precise levelling overland.

CANADA'S POSITION IN POWER

Many Large Projects Have Been Successfully Carried Out

Canada has for many years been a pioneer in water power development; in size of plants, size of units, greatest transmission spans, greatest area of distribution and greatest output from a single concern, she holds or has held the records. The Queenston-Chippawa plant has units of 60,000 h.p. each and is designed for an ultimate installation of 600,000 h.p.—several other plants are of about 200,000 h.p. each; the transmission line span of 4,800 feet (nearly a mile) built by the Shawinigan Company across the St. Lawrence river was at that time the longest single span in the world; the Hydro-Electric Power Commission of Ontario operates 22 water powers and distributes about 650,000 h.p. to 226 municipalities over 3,000 miles of transmission lines, forming the largest single distribution concern in the world, and in a list showing the output of the 14 largest electrical undertakings in North America, Canadian plants take first, sixth, ninth, and thirteenth, places in spite of Canada's much smaller population.

The Canadian national parks comprise an area of about 6,000,000 acres. They are sanctuaries for wild fowl, deer, mountain sheep and goat, moose, elk, bear, and buffalo, and a tourist wonderland of forest, well stock streams and lakes, glaciers, hot springs, waterfalls, and mountains.

CHANGES IN DOMINION LANDS ADMINISTRATION

Department of the Interior Effects Needed Economies by Consolidation

During the past few months the departmental organization in charge of the administration of Dominion lands in the three Prairie Provinces and the Railway Belt and Peace River Block of the province of British Columbia has been thoroughly overhauled with a view to providing satisfactory service at a minimum cost. Changing conditions have made it possible to reduce the number of Land Offices, the operation of the field staff has been simplified, and the number employed cut down by requiring all inspectors to undertake inspection work for all land divisions. In the past the Department of the Interior had homestead inspectors, Crown timber inspectors, grazing inspectors, and school land inspectors. Now there will be only one class of inspectors, namely Dominion land inspectors.

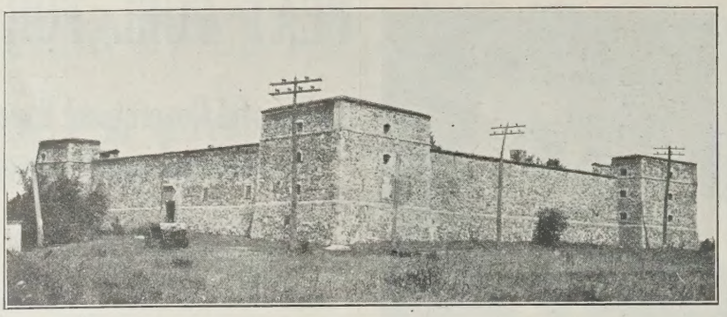
The changes made at head office in Ottawa will be of considerable interest to those who have land business to transact with the department. Up to the present time the land branches have been housed in several buildings in different parts of the city. However, they are now being concentrated in one building, the Norlite Building on Wellington Street, opposite the West Block. The establishment of this one office for the transaction of all Dominion lands business should prove a great convenience to those who have federal lands business to transact and, of course, the advantages from an administrative standpoint are obvious. At the same time it is confidently expected that a material reduction in staff can be effected as the amalgamation of related services progresses.

PRAIRIE TREE PLANTING

A feature of the work of the Forestry Branch of the Department of the Interior, which increases in importance from year to year, is the supplying, free of charge, of tree seedlings and cuttings for planting windbreaks on prairie farms. For the last few years about five millions of seedlings and cuttings have been sent out annually, under the direction of the Superintendent of the Dominion Forest Nursery Station at Indian Head, Saskatchewan. The species of trees sent out in largest numbers are Manitoba maple, Russian poplar, willow, green ash, and caragana.

It is impossible to say what the exact causes are which operating for centuries, have produced a lack of trees on the prairies, but it is generally thought by those who have given some attention to the subject that a large part of what is now prairie was not originally so; in fact there is direct evidence to show that at least some districts which are now treeless were originally well timbered. Undoubtedly the chief agency which little by little has caused the prairies to encroach on the timbered area is the frequently recurring prairie fire. It is well known to those familiar with the country that, if fires were kept out of a district for a number of years, small bluffs of poplar spring up all around the sloughs and low places, which if not disturbed gradually extend until eventually a formerly treeless district becomes well timbered.

Important deposits of iron ore are found in Ontario, Quebec, British Columbia, Nova Scotia, and New Brunswick.



View of the west and north outer walls of Fort Chambly, Quebec. The south and east walls are not so well preserved as those shown and therefore require more attention.

Fort Chambly a Relic of Early Canadian History

(*Continued from page 1*)

serving as a base of operations during the war of 1812-14 and for the internment of participators in the rebellion of 1837. Fourteen years later it was completely abandoned as a military post and in 1856 was transferred to the Canadian Government by the Imperial authorities. The fort came under the control of the Minister of Militia in 1887 and in 1921 was transferred to the Canadian National Parks Branch of the Department of the Interior. A pamphlet describing the fort has been issued and may be had upon application.

Forest Protection Conference

(*Continued from page 1*)

(5) Whereas the education of the children in the schools in regard to the protection of our forests from fire is of the utmost importance, Resolved that the forest services should consider it a part of their function to get into as close co-operation with their respective departments of education as possible, in order that the widest facilities may be secured for educational work on forestry problems amongst the school children.

(6) Whereas it is desirable that there should be some central clearing house for the collection and dissemination of publicity material in connection with forest fire protection problems, and Whereas in the opinion of the provincial authorities it is desirable that the Dominion Forest Service should act in this capacity, Resolved that the Dominion Government be requested to provide the necessary facilities in the Dominion Forest Service to enable them to undertake this work: Resolved further, that as the experience of all forest services is that the ordinary administrative officers have neither the time nor the specialized training necessary to carry out this class of duties, there should be appointed in the Dominion Forest Service a qualified director of publicity whose special duties should be to handle this line of educational campaign.

(7) Whereas a burning-permit law, properly enforced, is the only known method of controlling the fire hazard in forest districts, Resolved that this Conference records its conviction that there should be burning-permit laws in all provinces of the Dominion.

(8) Whereas the debris resulting from logging operations constitutes one of the greatest menaces to the timber supplies of Canada, and Whereas the methods of disposal of such debris, by closer utilization or by burning, are the only solutions to this problem, Resolved that, first, a program of technical research into the possible use of material now wasted should be inaugurated by the Forest Products Laboratories and that in the opinion of this Conference further facilities in personnel and appropriations should be provided by the Federal Government for this purpose, and second, that until such utilization is possible steps should be taken to dispose of slash by the enforcement of proper methods of disposal by fire; this Conference further records its conviction that there must be co-operation between the various governments looking to the adoption of concurrent regulations in this connection; provided that an exception be made in the case of the coast district of British Columbia where owing to peculiar conditions further study and research is necessary to determine the proper procedure as regards slash disposal.

(9) Whereas experience has shown that efficient forest protection can only be obtained under conditions wherein the forest authority has complete control of all forest activities on the lands under its jurisdiction, Resolved that this Conference recommends to all governments concerned the necessity of concentrating all matters pertaining to the forest under a unified forest service.

(10) Whereas in many parts of Canada the use of aircraft offers the only possible solution of the problem of forest fire protection, and Whereas the expenditure involved is beyond the financial means of forest authorities, Resolved that this Conference recommends that the Dominion Government should provide substantial assistance to the provinces, either by the donation of air service facilities or by subsidies to the provincial forest authorities sufficient to allow them to obtain service from commercial aircraft companies.

(11) Whereas experience has demonstrated that the use of the meteorological data is of extreme value in forest fire protection, Resolved that this Conference urges the Dominion Government to provide facilities for study and research by the Meteorological Service as to the means in which meteorological data can be applied usefully to fire protection and to arrange for co-operation by said service with the various forest authorities in Canada.

(12) Whereas educational and publicity work to be effective must be based on reliable information, and Whereas the present data collected by the various forest services with respect to forest fires and forest fire losses lacks uniformity, Resolved that in the opinion of this Conference there is need for standardization of methods and for the creation of a clearing house through which such information can be collected and disseminated; Resolved further that in the opinion of this Conference the Dominion Government through the Dominion Forest Service should undertake this work.

(13) Whereas forest fire control depends to a large extent on the ability of forest authorities to receive reports of and to get to the fire without delay, and Whereas at the present time the attainment of this object is hampered by the lack of means of detection and communication such as lookouts, telephones, trails, etc., Resolved that this Conference records its conviction that the forest authorities should immediately undertake a programme for completion of such forest improvement within the shortest time possible.

(14) Resolved that in the opinion of this Conference forest authorities should concentrate on "Save the Forest Week", and that the proclamation with reference to "Fire Prevention Week" issued in the fall should bear no reference to forest fires: Resolved further that for the year 1924 we recommend the date selected to be the week April 27 to May 3.

THOSE IN ATTENDANCE

Federal Representatives

Hon. Charles Stewart, Minister of the Interior; W. W. Cory, C.M.G., Deputy Minister; R. A. Gibson, Assistant Deputy Minister; J. W. Greenway, Commissioner of Dominion Lands; B. L. York, Controller of Timber and Grazing Lands Branch; H. W. Clarke, Chief Timber Inspector.

Canadian National Parks.—J. B. Harkin, Commissioner.

Forestry Branch.—E. H. Finlayson, Acting Director; D. Roy Cameron, Associate Acting Director; C. H. Morse, District Forest Inspector, Calgary; C. MacFayden, District Forest Inspector, Prince Albert; Lt.-Col. H. I. Stevenson, District Forest Inspector, Winnipeg; R. D. Craig, Forest Resources Specialist.

Dominion Railway Commission.—Clyde Leavitt, Chief Fire Inspector.

Provincial Representatives

British Columbia.—Hon. T. D. Patullo, Minister of Lands; P. Z. Caverhill, Chief Forester.

Ontario.—Hon. James W. Lyons, Minister of Lands and Forests; E. J. Zavitz, Chief Forester; C. R. Mills.

Quebec.—Hon. H. Mercier, Minister of Lands and Forests; G. C. Piche, Chief of Forest Service; Major O'Hara.

New Brunswick.—Hon. C. W. Robinson, Minister of Lands and Mines; G. H. Prince, Provincial Forester; L. S. Webb.

Nova Scotia.—Hon. W. J. O'Hearn, Attorney General; J. A. Knight, Commissioner of Forests and Game.

REGULATIONS

CHANGES IN TIMBER REGULATIONS

For some years the timber regulations applicable to Dominion lands in the Prairie Provinces, the Railway Belt and the Peace River Block in the province of British Columbia, did not make any provision for a reduced rate of dues to be charged on fire-killed or dry timber. They provided that settlers and persons living in cities, towns and villages might obtain permits to cut up to 25 cords of wood each permit year, subject to ordinary permit dues. Provision was also made that permits might be granted without competition to cut fire-killed or dry timber, subject to the ordinary rate of dues.

By Order in Council of November 20, 1923, the regulations were amended so as to provide that the rate of dues on all cordwood cut either under license or permit from fire-killed or dry timber shall be reduced to 25 cents per cord. The quantity which can be included in a permit for sale, has been increased to 100 cords per permit year. The section of the regulations which provided for the granting of permits without competition to cut fire-killed timber, subject to ordinary dues, has been rescinded, and provision has been made for the granting of permits at public auction to cut fire-killed timber on tracts not exceeding 9 square miles in area, subject to one-half ordinary permit dues, except cordwood, on which 25 cents per cord shall be charged. Provision has been made in the regulations whereby permits may be granted to owners and operators of mines to cut timber for the erection of buildings actually required in the operation of their claims, and for such quantity of cordwood as may be actually required for fuel in operating the mines, subject to ordinary permit dues, which in the case of cordwood cut from fire-killed or dry timber will be 25 cents per cord.

NATURAL RESOURCES CANADA

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VOL. 3 MARCH, 1924 No. 3

MARKED PROGRESS IN DEVELOPING CANADA'S POWER

STEADY GROWTH DURING PAST YEAR

Large Number of Projects Under Construction—Reason for Optimism for Future

Early in the new year in a public statement Honourable Charles Stewart, Minister of the Interior, reviewed the progress during 1923 throughout the Dominion of the development, distribution, and use of hydro-electric energy. He pointed out Canada's fortunate position in this regard and held that with low priced power—the key to all key industries—so abundantly available almost everywhere in the Dominion there was good reason for national optimism for the future.

It was shown that among the countries of the world Canada not only now ranks with the highest in per capita power development, but is certain to greatly increase her ratio during coming years. In the industrial progress of nations, that country which has the cheapest, surest, and most lasting source of power in quantity and suitably located, is certain to outstrip the others, everything else being equal. Canada, with her unique water-powers fortunately located in or close to her industrial areas, with vast and varied resources of raw materials, and with unrivalled transportation facilities both by rail and water, offers to manufacturers and financiers abundant and unusual opportunities for profitable trade and investment.

An analysis of the development which took place during 1923 discloses the fact that some 255,000 horse-power was added, thus bringing the total water-power installation in Canada to 3,228,000 horse-power. A more significant feature, however, is the large number of projects actually in progress of construction at the present time, or actively in prospect. These projects when brought to completion within the next two years will add to Canada's total more than 900,000 horse-power.

Among the provinces, Ontario led in installation during the past year, with 146,000 horse-power. This was chiefly comprised in additions to the Queenston and Ontario power plants of the Ontario Hydro-Electric Power Commission and in developments connected with the mining industry in northern On-

(*Continued on page 4*)

ANNUAL WILD LIFE CONFERENCE

Great Value to Canada of Game Resources Brought Out at Representative Gathering

The annual conference of Federal and Provincial officers on the subject of wild life held in Ottawa, February 6 to 8 inclusive, brought out more clearly than ever before the importance which is now attached to wild life as a natural resource. This is true in regard to fish, bird, and animal life but particularly in reference to fur-bearing animals and large game. Furs have always filled a large place in Canada's products and exports, while the increasing monopoly which Canada has in big game is not only of great advantage to her citizens but also tends to draw each year an increasing number of visitors from other countries to enjoy the benefits which Canada affords. The other predominant thought of the conference was that these resources were capable of great development by wise methods of conservation and that no time should be lost in improving and strengthening the plans already in force to this end.

Canada's Wild Life—A close-up view of a moose, one of the characteristic big game animals of the Dominion, which is much sought after by sportsmen from all parts of the world.

The conference which was held in one of the large committee rooms of the Parliament Buildings and which was representative of the Federal and Provincial services having to do with the protection of wild life was opened by Hon. Charles Stewart, Minister of the Interior. He extended a welcome to the members of the conference who attended from a distance and stated that among the multitude of responsibilities discharged by the Department of the Interior that of conservation of valuable wild life, including fur-bearing animals, game animals, and birds, occupied a very important place. The fur-bearing animals formed the chief means of support of Canadian Indians, lacking which the Indians would become a much heavier charge upon the Dominion. The trapping of fur also afforded a very valuable revenue to the country. Hon. Mr. Stewart said that he had spent many enjoyable days in hunting, and that it would be criminal, to say the least, to permit the pleasure and benefit to be derived from hunting to cease through the dissipation of our natural game resources. He trusted that the deliberations of the conference on these matters would be productive of much good.

At the conclusion of Hon. Mr. Stewart's address the conference organized for business and elected Mr. Arthur Gibson, Dominion Entomologist, Department of Agriculture, chairman and Mr. Hoyes Lloyd, Department of the Interior, secretary. Morning and afternoon sessions were held during the three days of the conference and the result was that in every way a much better understanding of all the ques-

(*Continued on page 3*)

CANADA'S FUEL PROBLEMS AND THEIR SOLUTION*

NEED OF SUBSTITUTES FOR ANTHRACITE

Work of Dominion Fuel Board on Different Phases of Question—Part Played by Water-Power

While the great national fuel problem facing Canada is a supply of fuel for what has been called the "Acute Fuel Area", embracing Ontario and part of Quebec, the seriousness of the situation for the present has to do with a supply of domestic fuel for this particular region and with the fact that this supply is being drawn from a small area in Pennsylvania where the reserves of coal are not large and exhaustion is in sight. In spite of the fact that about one-sixth of the world's coal supply lies within the Dominion, over one half of the amount used in this country (varying from 29 to 35 million tons annually) is being imported from the United States. It was to meet this situation that the Dominon Fuel Board came into existence in November, 1922.

Canada is faced with a number of coal problems, some of local, some of national importance. For example, the coal of Vancouver island has the competition of the cheap fuel oils from California, Mexico, and Peru; Alberta is forced to find adequate markets for her surplus coal production; the problem in Saskatchewan is the utilization of her great lignite beds; that of New Brunswick how best to mine the thin seams and make the greatest possible recovery; Nova Scotia's problem is that of submarine mining and increasing the production to supply the eastern provinces; while that of Ontario and western Quebec, as above stated, is to secure substitutes for about four and a half million tons of anthracite now imported from the United States. There is no reason to believe that the finding of such substitutes would be regarded at all by the United States as an unfriendly act, but rather the contrary, in view of the near exhaustion of the supply. The Dominion Fuel Board found that considerable progress had already been made towards a solution. The government of Alberta undertook a

**Prepared under the direction of Dr. Charles Camsell, Deputy Minister, Department of Mines, Canada.*

(*Continued on page 2*)

SURVEYING WITHIN ARCTIC CIRCLE

Delimiting Sites of Police and Trading Posts—Coal and Iron Outcroppings—Eskimo Villages

That the southern part of Baffin island contains two lakes comparable in size with lake Ontario and that the island, which is almost one thousand miles long from north to south, is nearly five times as large as Cuba, were some of the striking facts brought out in an address at the annual meeting of the Dominion Land Surveyors Association in Ottawa on February 7 by Mr. F. D. Henderson, D.L.S., of the Topographical Survey of Canada.

Mr. Henderson, in the capacity of surveyor and topographer, accompanied the 1923 Arctic expedition of the North West Territories Branch, Department of the Interior, under Mr. J. D. Craig, D.L.S. His duty was to survey lots for posts for the Royal Canadian Mounted Police, the Hudson's Bay Company and other private interests at the points at which the C.G.S. *Arctic* called, and to take magnetic observations and make topographical surveys wherever possible. In all eight lots were surveyed at Craig Harbour, Dundas Harbour, Eskimo Point, Ponds Inlet and Pangnirtung, and short traverses were run at the two latter places. As the governing lines of the Dominion Lands Surveys system have not been extended to the Arctic islands all lots were classed and numbered as group lots.

The conditions were unusual. Continuous daylight prevailed during part of the period in which the surveys were made, solar observations were the only kind taken and Greenwich time was obtained from the ship's chronometer, checked up by wireless, that great aid to the scientific worker in the field. Several of the surveys were made at top speed while the *Arctic* waited in the bay or made short trips up the coast; one was finished at 10 p.m., another at 11 p.m., of the long Arctic August day, and eight inches of snow fell during the progress of the last survey in September. The work at Craig Harbour in Lat. 76° 11′ is probably the most northerly survey of a parcel of land in any part of the world, certainly the most northerly in Canada.

In the intervals between survey work trips were made to inspect outcroppings of iron and coal (one of the latter is used locally as a source of fuel supply) and the condition of the Eskimo habitations, the character of the vegetation, etc., were noted. Mosses and lichens were everywhere in abundance, and flowers, the most conspicuous of which was the yellow Arctic poppy grew in all sheltered places, sometimes within a few feet of a glacier. No trees were found, the nearest approach being the shrub-like Arctic willow, with branches half an inch in diameter. The branches spread out horizontally close to the ground. It was sometimes possible to gather enough of the wood to boil a kettle. Blueberries were found at Ponds Inlet but smaller and not so sweet as in southern Canada.

At both Ponds Inlet and Pangnirtung there are native villages near the Royal Canadian Mounted Police and Hudson's Bay Company posts, containing normally from seventy-five to one hundred Eskimos each, although at times as many as two hundred natives assemble at these points. Those at the former post live in permanent huts which, under the direction of the authorities, have been neatly arranged in a line along the shore, whereas at the latter the natives still retain their skin igloos.

At many places there are remains of Eskimo encampments and villages, some of these are evidently very ancient and it was suggested that these would probably yield a rich store of valuable material to the archaeological excavator.

CANADA'S FUEL PROBLEMS AND THEIR SOLUTION

(*Continued from page 1*)

campaign four years ago to substitute her coal in Manitoba for both kinds of imported coal. Its measure of success can be seen from the fact that while Manitoba took 478,582 tons of American anthracite in 1919, this amount had fallen to 100,063 tons in 1923. In the East excellent work was done by the Joint Peat Committee of the Dominion and Ontario Governments in producing a domestic fuel out of peat, which offers a partial substitute for anthracite in furnaces in the spring and fall and for kitchen use all the year round.

After a survey of the whole problem, the Fuel Board decided to apply itself to the urgent phase of replacing the remainder of the anthracite by a fuel suitable for domestic purposes. The substitutes presenting themselves were—

The Fuels of Alberta.—Some of these had already proved satisfactory for domestic purposes and could be produced in sufficiently large quantities. The question here is one of the cost of transportation entirely.

By-product Coke.—This would permit the use of New Brunswick and Nova Scotia bituminous coals. Where intelligently used this has proved a better domestic fuel than anthracite. It is considered that if plants were built by gas companies at points where it would be commercially feasible to operate, coke would displace from 25 to 35 per cent of the total anthracite imported. It was announced by the president of the British Empire Steel Corporation that this company intended to build a coke plant in Montreal and extend the use of coke into the provinces of Quebec and Ontario. Tests are now being made at Hamilton from selected coal from the Maritime Provinces.

British Anthracite.—261,659 tons of British anthracite were imported into Canada in 1923. Cargoes last October could be contracted for at $1.75 per long ton from Wales to Montreal against $4.40 from Pennsylvania to Montreal. Although at the mine the Welsh coal was the higher in price, this was fully offset by its better quality. The Chairman of the Fuel Board has been assured that the movement of British coal to Canada would likely be permanent. The largest anthracite producing company in Great Britain has arranged for a branch in Montreal. An important aspect of this movement is its tendency to lower freight rates by providing return cargoes for ships carrying Canadian produce to Britain.

Wood.—In addition to the substitutes above enumerated, an investigation is being made to determine the extent to which Canadian hardwoods can be made use of for fuel purposes. At present, wood comprises one-quarter of the fuel consumed in the Dominion and amounts to about one cord per head of population.

Other Investigations.—Other avenues of promise being investigated are pulverized fuel for locomotives and power-plants, and the system of central heating plants.

Water Power.—No statement of the fuel problem of Canada is complete without taking into consideration the development of the water-powers of the Dominion. From 1886 to 1913 the total coal consumption of Canada increased in a fairly regular manner in proportion to the population and in 1913 the total first exceeded 30,000,000 tons. In 1921 the total was less than in 1913 and in 1922 it was 12 per cent lower than in 1921. It is shown by careful analysis that the stationary or slightly decreasing total is due to the increasing use of water-power. While the population increased 20 per cent in ten years the use of water-power in industry increased 254 per cent in the same time. It would take about 29,000,000 tons of coal to produce the horse-power now developed annually in Canada and at $10 a ton this represents $290,000,000. But for the hydro-electric development in Quebec and Ontario, these provinces would require more than twice their present supply of coal, which in 1921 was 18,690,000 tons. It is especially urgent that consumers of anthracite should recognize the necessity of at once taking up the question of securing substitutes, because of the certainty of the ultimate exhaustion of anthracite supplies and by reason of the fact that it is a change which cannot be made in a month or a year.

SILVER-LEAD MINING IN YUKON*

Development of Rich Lode on Keno Hill—History of Mayo District Mines

The silver-lead ores of the Mayo district, Yukon, have been attracting considerable attention lately on account of the discovery of high grade deposits on Keno hill.

Mayo district is situated in the eastern portion of Yukon and may be roughly defined as the watershed of upper Stewart river. Stewart river joins Yukon river 72 miles south of Dawson, and Mayo is situated 180 miles above the mouth of the Stewart. During the summer a regular service to Mayo is maintained by the White Pass and Yukon Route, connecting with the Yukon River steamers. Keno hill, the important mining centre of the district is 42 miles northeast of Mayo. Practically all haulage between the mines and Mayo is done by sled in the winter, and ore shipments are piled at Mayo to await the opening of navigation in the spring.

The first lode mining in Mayo district was done in 1912-13 when the Silver King deposit was opened. This property was worked continuously until 1917 when the ore shoot became exhausted and the property was closed down. Exact figures of production are not available. During the winter of 1914-15, 1,180 tons of ore were shipped having an average content of 270 ounces per ton and 31 per cent lead. In 1915-16 the tonnage shipped was much larger but the grade of the ore was not as high.

In 1919 the deposits on Keno hill were discovered and staked, the Yukon Gold Company immediately purchased the original claims and formed a subsidiary company, Keno Hill, Ltd., to operate the property. In the winter of 1920-21 this company shipped 2,150 tons of ore having a silver content of 197 ounces per ton and lead content of 60 per cent. At the same time a 100 kilowatt steam-power plant was installed on Duncan creek with a transmission line four miles long to the property.

In 1921 Keno Hill, Ltd., acquired the Sadie-Friendship group on the western slope of the hill, and Treadwell Yukon Co., entered the field, acquiring a group of claims adjoining the Sadie-Friendship property. During the winter of 1921-22 Keno Hill, Ltd., shipped from its original claims 3,100 tons of ore having a silver content of 224 ounces per ton and a lead content of 60.5 per cent.

During the winter of 1922-23 both companies were shipping ore, the production being 8,700 tons from which smelter returns are not yet available, but this ore is expected to average over 200 ounces of silver per ton and 50 per cent lead.

During the summer of 1923 the last of the known ore of shipping grade was extracted from the original holdings of Keno Hill Ltd., although a considerable tonnage of concentrating ore remains. The property, however, has been closed down for the present and work has been started on the Sadie-Friendship vein. On this deposit both companies are at present engaged, and workings have been carried to a depth of 300 feet without sign of diminishing values. Treadwell Yukon Co. is at present driving a drainage tunnel to tap the vein at a depth of 500 feet. This deposit will probably produce a much greater tonnage than the original discovery on Keno hill.

The development of the district has been greatly retarded by high mining and transportation costs. The latter have been considerably reduced by the introduction of the caterpillar tractor, and the former will doubtless be reduced when concentrating plants have been built. Plans for these are now being considered. As the district is still in its early stages further discoveries of high-grade ores can be expected. At the present time only high-grade ores can be worked as there is not sufficient tonnage in sight to justify the erection of a smelter and ores have to be shipped 3,000 miles or more to smelters on the Pacific coast.

**Prepared under the direction of Dr. Charles Camsell, Deputy Minister of Mines, by Mr. W. E. Cockfield, Geological Survey, Canada.*

The gross agricultural wealth of Canada in 1922 was estimated at $6,774,461,000 of which $681,887,000 was represented by live stock. The estimated gross agricultural revenue amounted to $1,420,170,000.

NATURAL RESOURCES CANADA

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—

HON. CHARLES STEWART,
Minister

W. W. CORY, C.M.G.,
Deputy Minister

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Natural Resources, Canada, **is published in French as well as in English, and readers may have whichever edition they prefer.**

OTTAWA, MARCH, 1924

ANNUAL WILD LIFE CONFERENCE

(*Continued from page 1*)

tions involved was reached by the delegates and the foundation laid for closer co-operation in all phases of the work. Among the subjects dealt with in the discussions were the following:—

Enforcement of laws relating to fur-bearing animals.

Problems arising from the collection of fur royalties, and measures for co-operation between provinces.

Possibility of granting Indians special trapping privileges.

Systems of registration of trap lines.

Regulation of interprovincial shipment of game and fur.

Changes in the regulations covering the export of game from Canada.

Economic status of hawks, owls, and crows.

Pollution of waters in Canada by waste and by the discharge of oil from steamers and other sources, and the harmful effect of this upon ducks and other aquatic birds.

Recommendations respecting Regulations under the Migratory Birds Treaty Act.

THOSE IN ATTENDANCE

Provincial Representatives

Prince Edward Island.—A. E. Morrison, President, P.E.I. Game and Fish Protective Association.

Nova Scotia.—J. A. Knight, Commissioner of Game and Forests.

New Brunswick.—G. F. Burden, Deputy Chief Game Warden.

Quebec.—J. A. Bellisle, Superintendent of Fish and Game; I. Heckt, Game Inspector, Montreal; Dr. J. U. DeLisle, Game Officer, Hull; Mr. Quinn, District Game Warden.

Ontario.—Geo. Rapsey, Superintendent, Department of Game and Fisheries; J. W. Coffey, Ottawa Office, Department of Game and Fisheries; Geo. Leach, District Game Warden.

Saskatchewan.—F. Bradshaw, Chief Game Guardian.

Alberta.—Benjamin Lawton, Game Commissioner.

British Columbia.—M. B. Jackson, Chairman, Game Conservation Board.

National Council of Women.—Mrs. J. A. Wilson.

Federal Representatives

Deputy Minister's Office.—John Harvie.

Canadian National Parks.—J. B. Harkin, Commissioner; Hoyes Lloyd, Supervisor of Wild Life; J. A. Munro, Chief Migratory Bird Officer for Western Canada; R. W. Tufts, Chief Migratory Bird Officer for the Maritime Provinces; H. F. Lewis, Chief Migratory Bird Officer for Ontario and Quebec; L. H. de Puyjalon; C. E. Nagle; J. L. Williams; Charles Parkinson.

North West Territories and Yukon Branch.—O. S. Finnie, Director; Maxwell Graham, Chief, Wild Life Division, N.W.T.

Department of Agriculture.—Arthur Gibson, Dominion Entomologist; Norman Criddle, Entomological Branch.

Department of Indian Affairs.—W. M. Graham, Commissioner; T. R. MacInnes.

Department of Justice.—James White, Technical Adviser.

Department of Marine and Fisheries.—Dr. E. E. Prince, Dominion Commissioner of Fisheries.

Department of Mines.—R. M. Anderson, Chief, Biological Division, Geological Survey; P. A. Taverner, Ornithologist, Victoria Memorial Museum; C. H. Young.

Royal Canadian Mounted Police.—Lt.-Col. C. Starnes, Commissioner.

Dominion Bureau of Statistics.—Miss T. A. Brown.

FINAL ESTIMATES OF CANADA'S FIELD CROPS

Total Yield of Wheat for 1923 was Largest on Record

The final report on the yield of the field crops of Canada for the year 1923 has been issued by the Dominion Bureau of Statistics. The total wheat crop of 474,199,000 bushels, as now finally estimated, is the largest on record for Canada, being an average yield of 21 bushels per acre.

The total yields of field crops during the year 1923 as compared with 1922 follow:—

	1923	1922
	(Thousands of bushels.)	
Wheat	474,199	399,786
Oats	537,733	491,239
Barley	76,998	71,865
Mixed Grains	29,750	27,708
Rye	23,232	32,373
Corn for husking	13,608	13,798
Buckwheat	9,744	9,701
Flaxseed	7,139	5,008
Peas	2,898	3,170
Beans	1,042	1,303
	(Thousands of cwt.)	
Potatoes	56,460	55,745
Turnips, mangolds, etc.	38,212	43,973
	(Thousands of tons.)	
Sugar beets	216	190
Hay and clover	14,845	14,488
Grain hay	4,336	.....
Alfalfa	1,029	806
Fodder corn	5,321	5,879

SALMON PACK SHOWS IMPROVEMENT IN 1923

Amount Canned in British Columbia Larger and Better than in Previous Year

Complete returns of the salmon pack of British Columbia for the year 1923 indicate a heavier run of salmon than for some years past. The pack totalled 1,341,677 cases last year, which is an increase of 51,351 cases over 1922. With the exception of the Skeena River and Naas River districts, all sections report good runs, and increased packs as a result. There was a satisfactory improvement in the catch of sockeye, which showed an increase of 35,033 cases.

The figures for the year's pack follow:—

	1923 (Cases)	1922 (Cases)
Total pack	1,341,677	1,290,326
District		
Fraser R.	224,637	137,482
Skeena R.	367,356	482,305
Rivers Inlet	127,774	86,828
Naas R.	99,580	124,071
Vancouver Is.	193,484	188,612
Outlying	328,846	271,028
Grades		
Sockeye	334,647	299,614
Fancy Red Springs	17,539	21,163
Standard Springs	4,858	11,913
White Springs	4,745	6,520
Bluebacks	7,097	6,431
Steelheads	1,760	1,657
Cohoes	111,695	102,845
Pinks	439,720	581,979
Chums	415,195	258,204

Canada's Wild Life—Gannets on the nesting ledges, Bonaventure island, Quebec. This interesting species is protected under Provincial and Dominion laws and its increasing numbers prove a great attraction to tourists. Inset—A family group of gannets.

SUCCESSFUL EXPERIMENT IN WINTER SURVEYING

Geodetic Engineers Run Base Line Across Frozen Surface of Lake

In a country of great distances and often gigantic natural features, such as Canada, surveyors are frequently faced with problems never met before, and it is a tradition of the service, if no old way will solve the difficulty, to go ahead and find a new one. In the heart of the Rocky mountains in the Yellowhead Pass region just west of the Alberta-British Columbia boundary lies Yellowhead lake, a deep and narrow sheet of water, which has the distinction of being the first lake in Canada to have a base line measured on its surface. Like the philosopher of old, who carried water in a sieve, the engineers solved their problem by waiting until the water froze. Handling instruments of steel and brass with bare hands high up in the mountains during the months of January and Ferbruary when the temperature falls below zero and snow-storms sweep the valley is not comfortable work but the officers of the Geodetic Survey of Canada laid out the work and carried it to a successful conclusion.

It is well understood that a base line, measured with an accuracy that admits of an error of only a small fraction of an inch per mile, is the first step in a triangulation such as the Geodetic Survey was carrying on from the Yellowhead pass northward, along the summit of the Rocky mountains to the intersection of the 120th meridian. A base line presupposes a fairly level piece of ground upon which it can be measured but in that sea of mountains the only level stretch was the surface of a lake, and as it would be impossible to sink posts in the bottom of the lake they were set up in the ice when the lake was frozen over.

A concrete pier was first built over the triangulation station at the east end of the lake. Starting from this point posts of the usual length were set in the ice at fifty metre intervals throughout the total length of 5,800 metres or a little over three and a half miles. This was done by cutting holes in the ice to a depth of about ten inches, putting the posts in position and then packing snow and water around them and leaving them to freeze over night. The posts when frozen in were solid, and no difficulty was experienced from shifting. Methods were adopted to eliminate any error which might be caused by the heaving of the ice. Measurements were carried on only when the weather would permit, as the thermometers on the tape, used to check the expansion and contraction, registered no lower than 2 degrees below zero Fahrenheit, whereas at times during the progress of the work the temperature was as low as 32 degrees below zero.

Several advantages result from the successful carrying out of this experiment. It now becomes feasible to select and run base lines in country where a base line on land would be impossible; the geometric figures of base nets can be improved, and at the same time a considerable saving of labour is effected by the elimination of the necessity of clearing the base line of timber.

There are 3,114 dairy factories in Canada. The value of the products is placed at $111,924,017.

LEADS IN GRAIN SHIPMENTS

Montreal Again Heads List of Grain Exporting Ports of North America

In the years 1921 and 1922, Montreal led the grain exporting seaports of North America. Last year, as shown by the following figures, the Canadian metropolis maintained her position as the leading grain exporter of the continent.

Port	Bushels.
Montreal, Que.....	120,013,938
New York, N.Y. ..	87,130,000
Baltimore, Md. ...	41,083,000
Philadelphia, Pa. ..	32,107,000
New Orleans, La. ..	22,793,804
Vancouver, B.C. ..	22,563,731
St. John, N.B.	17,710,871
Galveston, Texas...	10,469,000
Boston, Mass.	7,964,000
Norfolk, Va.	3,568,000

MARKED PROGRESS IN DEVELOPING CANADA'S POWER

(Continued from page 1)

tario. Quebec was second, with some 44,000 horse-power comprised chiefly in additions to the Cedars plant of the Montreal Light, Heat & Power Consolidated, and in new plants for Price Brothers & Co. at Chicoutimi and the Lower St. Lawrence Power Company near Metis. In Manitoba 28,000 horse-power were added by the Manitoba Power Company, and British Columbia closely followed with 26,500 horse-power accounted for by a new plant of the East Kootenay Power Company and additions to the plants of the Granby Consolidated Mining, Smelting and Power Company and the Pacific Mills, Limited. Nova Scotia increased its total by 7,800 horse-power in new developments for the Nova Scotia Power Commission and the Avon River Power Company, and in New Brunswick 2,500 horse-power were added to the Maine and New Brunswick Power Company's plant.

With regard to works at present under way or in active prospect, Quebec leads with a very extensive program included in which are such outstanding developments as those of the Quebec Development Company, on the Saguenay river, the St. Maurice Power Company, on the river of the same name, and numerous others totalling more than 550,000 horse-power. Ontario also has an extensive program ahead, including a number of developments and additions for the Ontario Hydro-Electric Power Commission, a development for the Hollinger Consolidated Gold Mines, and other lesser works comprising a total of more than 300,000 horse-power. The other provinces are also well represented, with activities under way in Manitoba, British Columbia, and Nova Scotia totalling 80,000 horse-power.

MINING IN NORTHERN MANITOBA

In the Pas mining district, comprising northern Manitoba, 1,636 mineral claims have been staked out and acquired, containing a total area of about 125 square miles. This area includes the Flin Flon and Herb Lake districts, where valuable copper and silver ores have been discovered. At Bingo Mines, situated on Herb lake, a modern plant has recently been installed, and four thousand tons of high-grade ore have been mined.

THE CANAL SYSTEM OF CANADA*

Where Improved Waterways are Located and When Constructed—Extent of Canal Traffic

Water transportation has from the first been an important factor in Canada's development, as was natural, with the great extent of her coastal and inland waters. Canals are necessary to overcome the obstructions in the natural waterways which admit of access from the Atlantic ocean to the heart of the continent, and this article deals with what Canada has done in the improvement of navigation by the construction of canals and the provision of deep water channels.

The canal systems of the Dominion under government control are as follows:—

1. The main artery, known as the St. Lawrence and Great Lakes route, between Montreal and lake Superior, 1,214 miles.

2. The secondary canal systems comprising:—

(*a*) The route from Montreal to Kingston, via the Ottawa and Rideau rivers, (Carillon, Grenville, and Rideau canals), total 252 miles.

(*b*) The navigation of the Richelieu river from its junction with the St. Lawrence to lake Champlain (Chambly canal) Montreal to International Boundary, 127 miles.

(*c*) The route from lake Ontario to Georgian bay known as the Trent canal, completed, 204 miles; partially completed, 32 miles; branches, 53 miles; total, 289 miles.

(*d*) Single locks and communicating channels: St. Andrews lock (Manitoba), St. Peters canal (Cape Breton), and Murray canal (Prince Edward county, Ontario).

Of the 1,214 miles of waterways extending from Montreal to lake Superior the canals proper form 74 miles. These include the more important canals known as the Lachine, Soulanges, Cornwall, Farran's Point, Rapide Plat, Galops, Welland, and Sault Ste. Marie. The normal level of the water of lake Superior is 553½ feet higher than that of the port of Montreal, and ships moving westward are lifted this height by means of 48 locks.

The first canals in Canada were made around some of the rapids of the St. Lawrence and Ottawa rivers to enable the canoes of the early voyageurs to avoid difficult portaging. In 1780 the Coteau du lac and the Split Rock canals were opened. The locks were 20 feet long, 6 feet wide, with 2 feet depth of water. In 1802, the forerunner of the present great locks at Sault Ste. Marie was opened by one of the early fur-trading companies—the original North West Company. This lock was 38 feet 8 inches long, 8 feet 9 inches wide and had 9 feet of water. The Lachine canal above Montreal, 8½ miles in length, with locks 108 feet long and depth of water 4 feet 6 inches, was opened for traffic in 1824, and the Welland canal between lakes Ontario and Erie in 1833, the locks of the latter being, however, 2 feet longer and with 8 feet 6 inches of water.

View, looking west, of the Canadian canal, Sault Ste. Marie. The total traffic tonnage of the canals at this point is greater than that of other great canals of the world.

To meet the demands of the carrying trade and of the great industrial development of the country the different canals have been several times enlarged since 1840.

The present Welland canal is the third of that name to be built, that of 1833 having been reconstructed in 1845 and the latter again in 1882. The Welland ship canal, now under construction, will have locks 800 feet in length, 80 feet wide and with 30 feet of water on the sills, though for the present the reaches will be excavated to a depth of 25 feet only. The number of locks will be reduced from 26 to 7. Of those the three ascending the escarpment will be double locks in flight, by means of which boats may ascend and descend at the same time. The actual raising or lowering of the locks will require only 8 minutes, and the passage from lake to lake will be made in 8 hours as against 15 to 18 hours at present.

The Sault Ste. Marie canal, commenced in 1888 and completed in 1895, has a lock 900 feet long, 60 feet wide and a depth of 20 feet 3 inches of water. The minimum depth of water throughout from Montreal to lake Superior is 14 feet, with a minimum lock length of 270 feet and a minimum width of 45 feet.

The volume of traffic through the canals of the Great lakes gives an idea of their importance. The canals handling the largest tonnage are at Sault Ste Marie. There are several canals at that point, the Canadian canal already described and those on the United States side. The combined traffic of these canals in 1922 amounted to slightly over 66,000,000 tons. This was in the main composed of coal, iron ore, and grain and it is worthy of note that of the total of 275,000,000 bushels of grain locked through these canals, in 1922, 227,000,000 bushels were the product of Canadian farms. While conditions, of course, are entirely dissimilar, it will be of interest to compare this traffic with that of other great canals of the world. The most recent traffic figures are:—

Manchester Ship canal, 4,273,544 tons.
Panama canal, 10,884,910 tons.
Suez canal, 17,574,657 tons.
Sault Ste. Marie canals, 66,000,000.

The first three mentioned canals are in operation all the year round, the Sault Ste. Marie canals during the seasons of navigation only. As illustrating the development of lake navigation, it is of interest to note that 30 years ago (1894) the largest boats on the lakes carried maximum cargoes of between three and four thousand tons. The modern type of vessel carries easily cargoes ranging from ten to fourteen thousand tons.

The total expenditure on the canals of Canada to date has been $202,165,744; the revenue received, $19,822,927. No tolls have been charged on the canals since 1903, and revenue since that date, now amounting to about three quarters of a million dollars a year, is from hydraulic and other rents, wharfage and elevator charges.

**Prepared from material supplied by the Department of Railways and Canals, Canada.*

REGULATIONS

CHANGE IN ALKALI MINING REGULATIONS

Under the Alkali Mining Regulations, which govern the disposal of natural accumulations of soluble mineral salts, a royalty was fixed at the rate of 12½ cents a ton on shipping weight, as determined from transportation returns at first point of shipment, which royalty, however, should not be less than 12½ per cent of the selling value of the salts or brine in their natural state, but not refined.

This selling value has now been fixed at two dollars a ton, so that the maximum royalty which may be collected shall not, in any case, exceed twenty-five cents a ton of two thousand pounds.

WATER-POWER DEVELOPMENT

The installed horse-power of hydraulic turbines in Canada has increased from 1,446,000 in 1912, to 2,970,000 in 1922, or by 105 per cent in 10 years. The effect on coal consumption is strikingly illustrated by the official coal statistics, which show that in spite of increase of population and far more than proportionate increase in manufacturing industry, the total coal consumption in 1922 was less than in 1913—the actual figures are: for 1913, 31.6 million tons; for 1922, 31.3 million tons.

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"SAVE THE FOREST WEEK" PROCLAIMED; APRIL 27 TO MAY 3

ROYAL PROCLAMATION ON FOREST PROTECTION

All Citizens Called Upon to Help Preserve This Great Resource

His Excellency the Governor General by Royal Proclamation has appointed the period from 27th April to 3rd May inclusive to be observed as "Save the Forest Week." This is one of the important developments of the forest protection movement, which was evidenced by the holding of the British Empire Forestry Conference in Canada last summer and the Dominion Forest Protective Conference in Ottawa last January.

The proclamation first deals with the importance of the forest and then indicates the duties of all citizens in relation to "Save the Forest Week."

The following reasons are given for the setting aside of this week:—

(1) The perpetuation of our forests is necessary for the industrial welfare and national strength of Canada.

(2) The losses from forest fires have been enormous and have caused much greater depletion of timber wealth than legitimate cutting operations.

(3) Canada is recognized as the chief source of supply of coniferous timber within the Empire and if her position as an exporter is to be maintained forest fires must be curtailed.

(4) Forest fires frequently result in disastrous loss of life and of valuable property other than timber; they lower the vitality of the remaining forest and render it more susceptible to insect and fungus attacks; and disturb the equilibrium of stream flow with evil effects on agriculture, water-power, and navigation.

It is pointed out that the great majority of forest fires are entirely due to inexcusable neglect or ignorance and therefore the exercise of reasonable prudence by individuals would reduce the losses to small proportions. The citizens of the Dominion are therefore urged to give heed to information disseminated by forest protective agencies and to act upon the following suggestions—

(1) That settlers and others engaged in the clearing of land should fully observe the fire laws of the Dominion and of the province, which laws have been enacted for their protection, as well as for the preservation of our timber resources;

(*Continued on page 2*)

A MESSAGE FROM THE MINISTER OF THE INTERIOR

The present situation in Canada generally, with respect to the wastage of our forest resources through forest fires is a matter of great concern. The losses in the past few years have been appalling. Statistics compiled for the British Empire Forestry Conference last summer show that on the average 5,779 fires occur each year. These fires burn over 720,000 acres of merchantable timber and 1,320,000 acres of young growth. The annual timber loss is estimated at nearly 4,000 million board feet. The monetary loss, figuring stumpage value of timber only and property damage, etc., amounts to over $14,500,000.

This sum, while large enough of itself, does not represent the full economic loss. In our forest industries, more than in any other, the cost of the manufactured product is made up of labour charges. The destruction of present and future timber stumpage results, therefore, in direct loss of the means of livelihood of an important part of our population. It is further a menace to the permanency of the forest industries themselves which to-day produce five hundred million dollars annually in wealth and are second only to agriculture in importance.

A world shortage of softwood timbers looms on the horizon. Our prosperity and our national safety alike demand careful use and preservation of these forest resources. We have not been careful in the past. We have been careless and wasteful. The lavishness of nature has been more than matched by the prodigality of man. Our forest fires have destroyed and still destroy more timber each year than is converted into lumber, and this despite the fact that over ninety per cent of all forest fires are directly attributable to human neglect.

These facts speak for themselves. We have been doing those things which we ought not to have done, and we have been leaving undone those things which we ought to have done. The remedy is within our reach. If ninety per cent of Canada's forest fires are caused by human neglect, then ninety per cent can be prevented by human care and precaution. Every settler, every logger, every hunter, every camper, every railway employee, every true citizen of Canada must do his part. The individual care required is so slight, and the general carelessness so appalling in its results. Canada has lost in direct values alone $73,000,000 in the last five years through forest fires. Let us all resolve during "Save the Forest Week" to reduce this loss during the next five years by ninety per cent.

CHARLES STEWART,
Minister of the Interior.

Fires like this cost Canadian taxpayers many million dollars yearly. Help to prevent them.

THE USE OF AIRCRAFT IN PROTECTING TIMBER

Aeroplanes Have Proved Great Aid in Patrolling Northern Forest Areas

It is probably not an overstatement to say that the use of aircraft in forest protection work has been developed to a greater degree in Canada than in any other country. This is due to the particularly favourable conditions which exist for flying operations, to the determination of the Department of the Interior to use the most efficient methods to protect our forests from fire, and to the enthusiastic co-operation of the Royal Canadian Air Force in this endeavour. Forest officers from all over the Empire who were in Canada last summer in attendance at the British Empire Forestry Conference were deeply interested in the results secured in this country and a number of them gave it as their belief that the permanent solution of many of their own problems could be obtained only by adopting similar methods to those in use in Canada.

It is only natural that Canada should be the pioneer in this field because there exists in this country, more than in any other, not only the opportunity, but the necessity for the use of aircraft in forest protection work. There is in Canada a vast northern area of inaccessible and uninhabited country of Laurentian formation, suitable only for timber production. Forest fires have ravished this region terribly, but there still remain large areas of valuable timber and tremendous stretches of promising young growth. On these the future prosperity of the forest industry, Canada's second largest industry, must depend. The protection of this heritage from fire is a matter of vital concern to every citizen of Canada. Prior to the advent of the aeroplane, the lack of means of communication and transportation, coupled with the natural hazards attendant upon adverse climatic conditions, notably prolonged droughts during the hot season, presented to the forest authorities of this country a problem in fire protection which in view of the means available practically defied solution. Is it any wonder then that the men in charge of our forest protection services seized on the use of aircraft with great energy and with great expectations?

The work done to date has been

[(*Continued on page 4*)

CLASSIFICATION OF WESTERN LANDS

Settlement of Prairie Lands Promoted by Stock-taking Investigation—Low Cost of Survey

During the past few years, and particularly during the past twelve months, there have come from many quarters suggestions and requests for the classification of the lands in the Prairie Provinces. The object of those who urged this work was that each area of land might be devoted to its highest use, viewed from a national and economic standpoint. The land is the basic natural resource of the country and the Department of the Interior has for some time been seized of the importance of its classification, and at the close of the war assigned to the Topographical Survey of Canada, a portion of the staff of which had been given special training, the duty of making such a stock-taking survey of unoccupied lands. In order that the results might be of more immediate benefit, the districts chosen for investigation were within easy access of the railways.

The object of these land classification surveys is two-fold. On the one hand it is to provide government officials with accurate information of what lands are suitable for settlement, in order that incoming settlers may be intelligently directed to land where they have a reasonable chance of making a comfortable living. On the other hand there is much land not suitable for agricultural purposes but which should be reserved for forestry, park, or grazing purposes. When settlers are allowed to locate on these latter lands, failure, as has been proved in all parts of the continent, is the result, and the whole district is adversely affected, but if properly utilized they become an asset to the district.

The surveys have accordingly been divided into two classes, those of areas where the lands are essentially agricultural, and those of lands comprised within or in the immediate vicinity of forest reserves or proposed forest reserves. The unit of investigation is in both cases the quarter-section and the information obtained is made available for government officers and the general public by means of maps, plans, photographs, and reports.

The work in the field consists of making a personal examination of every quarter-section and from the information gained thereby of classifying it in accordance with its present or its potential value for settlement. Three main subdivisions are made on the following basis:—

1. Quarter-sections with good soil and suitable surface as the first requisite.
   (*a*) Ready for immediate settlement in that there are at least thirty acres clear with the remainder easy to clear.
   (*b*) Covered by small timber which can be cleared economically.
   (*c*) Covered with heavy timber and requiring extensive improvements.
2. Quarter-sections which when cleared will not be first class farms but will offer inducements to certain classes of people or will serve for certain purposes.
3. Quarter-sections not suited for farming but which should be reserved either for grazing or forestry purposes.

During the survey the character of the soil is noted and frequent samples are taken for more precise determination at the Soils Laboratory maintained by the Survey at Saskatoon in co-operation with the University of Saskatchewan. In addition information is recorded and reported on with respect to the forest cover, the water supply and drainage, the climatic conditions, the existing routes of travel and their condition, the progress of settlement and improvement already made in the district, the marketing points, the schools, churches, and municipal improvements already existing. In short, complete information about the local conditions is gathered for the use of intending settlers.

A classification map and a soil map of each area are published for free distribution and may be obtained at the Dominion Lands Office of the district or from Ottawa. In addition plans are prepared for the townships examined showing the topography, soil, forest cover, roads, cultivated areas, houses, schools, post offices, etc. These township plans are not prepared for general distribution but copies are supplied to the Agent of Dominion Lands in whose district the lands are situated. Any person wishing information about the locality may investigate at the Dominion Lands Office these plans and the detailed report of the surveyor who made the classification. Any of this information will be furnished to the public from Ottawa but in the case of the coloured topographical township plans it has been found necessary to charge a small fee.

Up to the present time the staff of the Topographical Survey of Canada has classified in the manner herein described about 23,424,000 acres of ordinary lands and about 2,432,000 acres of lands in or immediately adjoining forest reserves, and the examination is proceeding at the rate of about 4,000,000 acres per year divided between the two classes. The cost of this examination is 1½ cents per acre for field work or 1½ cents per acre including the cost of issuing the maps and reports.

ROYAL PROCLAMATION ON FOREST PROTECTION

(*Continued from page 1*)

(2) That at this time of the year, when thousands are looking forward to spending their summer vacations in the woods, all should take cognizance of the fact that the camp-fire, which is one of the most pleasant and valuable adjuncts of camp life, may, if neglected, easily result in disaster; and that to prevent repetition of such losses as have been annually sustained from this cause, all persons should familiarize themselves with the proper methods of building, using and extinguishing such fires;

(3) That loggers, saw-mill operators and others interested in timber operations should see that all equipment and appliances designed to prevent the origin or spread of fires shall be overhauled and placed in a state of thorough repair; that such persons should review with care the fire protection requirements of the legislation under which they operate; and that they should see that all employees working under their direction are properly instructed as to the danger of fire.

UTILIZATION OF POWER RESOURCES

Rapid Growth of Total Installation—Important Industries Connected with Extension

The growth in the utilization of Canada's water-power resources has been truly spectacular. The total installation at the beginning of the present century of 150,000 h.p. had grown in 1910 to almost 1,000,000 h.p. and in 1923 to more than 3,225,000 h.p. By 1925 this total will have reached 4,000,000 h.p. and by 1940 it is estimated that the figure will be somewhere between 7,000,000 h.p. and 8,500,000 h.p. The present investment in hydro power development amounting to some $687,000,000 will have grown by 1940 on the above basis to a figure between $1,500,000,000 and $1,800,000,000.

The water-powers of Canada now awaiting development are in almost all cases either the property of the Dominion or of the province in which they are situated, consequently rights for their development are obtained directly from the Crown. Usually the Crown grants a lease or license authorizing the development for a fixed period varying from ten to ninety-nine years, generally with renewal privileges. Canada is fortunate in that these sources of hydraulic energy are favourably situated to serve with low-priced power the principal centres of population and to assist in the development of the other natural resources of the country.

The growth of hydro-electric power utilization has been chiefly in connection with the following industries:—

The Central Electric Station industry, the agency through which electric power is generated and sold for commercial and domestic use, is almost wholly dependent in Canada upon water-power; more than 97 per cent of the output being derived from this source. With the exception of a few cities situated principally on the western prairies, practically every large centre of population in the Dominion is served with hydro-electric power. The total hydro-electric installation in the industry of 2,411,700 h.p., together with transmission and distribution facilities, represents a capital investment of some $600,000,000.

The Pulp and Paper industry, which is outstanding among Canadian industries and is based upon widespread forest resources, is almost entirely dependent upon water-power for its motive energy. More than 497,000 horse-power in water-power installation are developed directly by the industry and an additional 229,000 horse-power of hydro-electric energy are purchased from central electric stations, making a total of 726,000 horse-power derived from water-power. It is a most fortunate circumstance that wherever timber resources are found throughout the Dominion ample water-power resources are also available for their exploitation.

Mining, with Allied Chemical and Metallurgical industries, is very largely carried on with the aid of water-power in Canada. This is especially true in the mining and refining of the precious metals, gold and silver, of nickel, copper, asbestos, and others. Water-power has made possible the tremendous development of gold and silver mining in northern Ontario where supplies of native coal are entirely absent. Milling, textile, and many of the other important industries of the Dominion are also very largely dependent upon hydro-power.

WATER POWER AND FUEL POWER

Of all the mechanical power now in use in Canada for all purposes, except steam railroads and motor cars and lorries, 70 per cent is produced by water power and 30 per cent by fuel power. The great relief to the fuel situation from water power development over what it would otherwise have been is very apparent.

PLANTATIONS OF TREES SUCCEED ON PRAIRIES

Mennonite Settlers Among First Planters—Work of Forestry Branch

In the southern part of Manitoba there are over a score of Mennonite villages each surrounded by trees planted by the Mennonites themselves. The accompanying photograph shows the main street of one of these villages, in a district that was once bare prairie, and is typical of other villages.

Tree Planting on the Prairies—Picture shows the vigorous growth of trees in one of the Mennonite villages in southern Manitoba in a district formerly treeless and in which it was once supposed trees could not be grown.

In this connection it may be noted that the Mennonites were among the earliest planters of trees in a systematic way on the prairies. In the year 1900 the Forestry Branch of the Department of the Interior began the distribution of trees from the Forest Nursery Station at Indian Head, Saskatchewan, for the planting of shelter-belts on prairie farms. The first year only a few thousand trees were distributed but the work has steadily expanded until now about five million seedlings and cuttings are sent out annually from the Indian Head and Saskatoon Stations. The work is carried on co-operatively, the Department of the Interior supplying, free of charge, the planting stock and providing the necessary instructions as to planting, while the settler pays the express charges, furnishes the labour, and agrees to devote the land required to this purpose permanently. The plantations have been most successful. Between 85 and 90 per cent of the trees set out in the past twenty-three years are in vigorous growth and a notable expansion in the work is now taking place .

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—

HON. CHARLES STEWART,
Minister

W. W. CORY, C.M.G.,
Deputy Minister

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OTTAWA, APRIL, 1924

RETURNS OF FUR TRADE IN N. W. TERRITORIES

Numbers and Average Values of the Different Pelts in Fiscal Year, 1922-23

The value and extent of the fur trade conducted under the N.W. Game Act in the North West Territories, is shown by the following summary of the returns received during the fiscal year 1922-23 in the North West Territories and Yukon Branch of the Department of the Interior:—

Animal	No.	Average value of pelts $ cts.
Moose	47	2.85
Caribou (deer)	546	1.65
Mountain sheep	8	....
Mountain goat	96	....
Otter	66	27.26
Beaver	2,416	18 38
Marten	9,058	20.61
Fisher	10	74.65
Mink	7,857	9.00
Muskrat	168,178	1.53
White fox	26,047	38.26
Blue. fox	68	70.87
Red fox	374	12.46
Cross fox	1,405	50.36
Black fox	12	6.12
Wolf	342	10.35
Wolverine	246	17.56
Lynx	235	20.37
Skunk	45	2.34
Ermine	5,409	0.55
Brown bear	323	9.26
White bear	40	18.08
Coyote	3	9.07
Silver fox	4	147.36

Total approximate value of pelts, $1,659,619.74.

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Virgin Sitka spruce is the best known material for aeroplane construction. In parts of Queen Charlotte islands, British Columbia, it forms 35 per cent of the timber stand.

CANADIAN HELIUM FOR AIRSHIPS*

Alberta Fields the Most Promising Source of Supply of this Unique Gas

The revived interest in the proposals for an airship service from Great Britain to India and Australia raises the question whether Canada can supply helium in commercial quantities for the inflation of such airships.

The United States airship, Shenandoah, is the first large dirigible in which helium has been used and its survival in the recent gale when blown away from its mooring mast a few weeks ago is probably largely due to this fact. While helium has eight per cent less lifting power than hydrogen its non-inflammability more than compensates for this defect. The chief drawback to its use is at present its high cost and also its comparative scarcity.

The recent survey of the helium resources of the United States by the Bureau of Mines showed that a large number of natural gases distributed through several States contain up to 0.5 per cent of helium. A smaller number of gases were found to contain from 0.5 per cent to 1.0 per cent and these are the only ones at present considered suitable for the commercial extraction of helium. It is stated that over 50,000,000 cubic feet of helium annually could be obtained by five or six plants and that in an emergency this volume could be doubled.

The cost of helium produced in the two plants erected at Fort Worth, Texas, during the latter stages of the war ranged downward from $150-$100 per thousand cubic feet. It is anticipated that this cost will be reduced to $30 in the new plant to be built on the plan of the semi-commercial unit now being experimentally operated.

At the request of the British Government an investigation of the helium resources of the British Empire was commenced in 1915 under the direction of Prof. J. C. McLennan, of the University of Toronto. The result of this survey, published as Mines Branch Bulletin No. 31, showed that natural gas from the Bow Island field in Alberta was the richest known source in the Empire available for commercial production. This gas contained 0.33 per cent helium. An experimental plant was erected at Calgary in 1919 where about 60,000 cubic feet of helium of varying grades of purity was produced during the four months' operation.

During the past year the Mines Branch of the Department of Mines has commenced a further survey of the Canadian resources of natural gas and helium. This work has included the collection of the latest data on the helium situation. Samples of gases from the new wells have already been collected and analyzed.

Ontario and Alberta are the only provinces in Canada in which natural gas occurs in commercial quantities. Several gases in Ontario have a helium content of about 0.3 per cent, especially those from Brant and Haldimand counties, but the supplies are from small wells in declining fields. The quantity of helium that might be extracted would be small.

In Alberta the Bow Island field is also showing signs of exhaustion. It was calculated in 1916 that about 12,000,000 cubic feet of helium a year could be extracted from the gas supplied to Calgary alone. This estimate was probably too large and the present annual output would undoubtedly be much smaller, especially as the field is now only drawn upon in winter. Calgary is no longer a suitable location for an extraction plant as the gas at present supplied to the city is a mixture of gases from the Turner Valley field and from the Bow Island field. The helium content of gas from the former field is very low.

One new source already discovered is the field at Foremost, forty miles south of Bow Island. The first well drilled in this area has an open flow of fifteen million cubic feet of natural gas per day and is the largest gasser in Canada. The helium content of this gas is 0.2 per cent. Gas from the fields in Central Alberta, at Viking and Wainwright, only contain 0.06 per cent. Gas from Medicine Hat and Many Islands, is equally low in its helium content.

It might be possible to extract helium from natural gas in southern Alberta to an extent of about 15,000,000 cubic feet annually. This would supply five or six dirigibles of the present R class. The cost would be proportionately greater than in the United States where gas of 0.24 per cent helium content is treated. Extended investigations would also be necessary before a suitable plant for treating gas of such low helium content could be designed and operated commercially on a large scale.

Prepared under the direction of Dr. Charles Camsell, Deputy Minister, Department of Mines, by Mr. R. T. Elworthy.

LAKE ONTARIO'S FISHERIES

Gratifying Success of Dominion Hatcheries in Restocking with Whitefish

Gratifying results are reported by the hatcheries service of the Department of Marine and Fisheries from the work of restocking lake Ontario with whitefish. The great catch of this species taken by Canadian lake fishermen during the season of 1922 totalling 21,020 cwt. as compared with 12,034 cwt. in 1917, and 1,266 cwt. in 1895, gives a good idea of the extent to which the whitefish fishery has been re-established in this great inland body of water.

The Department of Marine and Fisheries undertook the restocking of lake Ontario at first with fry from the hatchery at Sandwich but the fishery showed such promising results that it was found feasible, in 1914, to establish one of the largest whitefish hatcheries in the province of Ontario on the bay of Quinte. The work has progressed rapidly during recent years and the number of eggs collected each year by the new hatchery has increased from 30,000,000 during the first years of its operations to 221,715,000 in 1923.

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The Cobalt and adjoining areas of the Timiskaming district, Ontario, have been for several years the chief source of the world's supply of cobalt. Metallic cobalt, cobalt oxide, and cobalt salts are recovered from the treatment of the ores and residues derived from the silver-cobalt-nickel arsenides.

ADVISORY BOARD ON MINING REGULATIONS

Deals With Changes and Other Matters Submitted by Department of the Interior

In the Department of the Interior is vested control of nearly all of the mining lands and mining rights which are the property of the Federal Government. The disposal of these rights is carried on under Regulations approved by the Governor in Council.

It is the policy of the Government to have the Mining Regulations revised from time to time as changing conditions justify such action. The requests for revisions are numerous and frequently when such were under consideration it was found advisable to ask for assistance from officers of the Department of Mines with special knowledge of the industries affected or likely to be affected. With a view to having matters of the kind mentioned handled in the best interests of all concerned the Deputy Minister of the Interior arranged with the Deputy Minister of the Department of Mines for the creation of an Advisory Board to the Department of the Interior on Mining Regulations and related matters the personnel of which comprises Dr. Charles Camsell, Deputy Minister of Mines as chairman and Messrs. J. McLeish, Director of the Mines Branch, Department of Mines; H. H. Rowatt, Superintendent, Mining Lands Branch, Department of the Interior, and O. S. Finnie, Director, North West Territories and Yukon Branch, Department of the Interior. The Board meets at the request of the Deputy Minister of the Interior and when such action is advisable additional officers of the Interior and Mines Departments are asked to assist in the deliberations of the Committee.

PROPAGATING SALMON TROUT

A total of 40,000,000 salmon trout eggs has been collected during the last season by the Department of Marine and Fisheries in lake Huron, Georgian bay, and lake Superior.

The collection and hatching of these eggs is conservation in the highest sense of the term, as they are obtained from the commercial catch of fish and if they were not saved would go into the offal barrels and be a total loss so far as reproduction and the maintenance of the fisheries of the Great Lakes is concerned. The total number obtained compares favourably with the average collections of recent years and is sufficient to fill all the hatcheries on the Great Lakes engaged in the propagation of salmon trout.

STONE PRODUCTION IN CANADA

During 1922, the production of stone from quarries in Canada had a total value of $5,974,993. The values of the chief kinds of stone quarried were: limestone, $4,175,941; granite, $1,486,250; marble, $231,894; and sandstone, $80,908. The output of the principal producing-provinces was valued as follows: Ontario, $2,969,926; Quebec, $2,342,316; British Columbia, $324,591; Nova Scotia, $119,492; Manitoba, $106,638; New Brunswick, $104,730; Alberta, $7,300.

PRAIRIE INDIANS REAP BIG CROPS IN PAST SEASON*

IMPROVED METHODS YIELD HIGH RETURNS

Department of Indian Affairs Reports Harvest of 1,277,029 Bushels—Would Make 16 Trainloads

That the Indians of the three Prairie Provinces, who up till a few years ago were nomadic hunters, produced in 1923 the astonishing total of 1,277,029 bushels of grains of all kinds is information most gratifying to all interested in the welfare of these wards of the Government. The significance of this great crop which is a half a million bushels larger than the crop of 1922 will be made more apparent by an illustration.

This crop of grain, if placed in box cars of the average capacity, would fill 816 cars, which at 51 cars to the train would make 16 trainloads of grain. These trains with their locomotives and cabooses placed end to end would reach a distance of six and one-half miles.

As there are 31,066 Indians in the Prairie Provinces, or in round numbers 6,200 families, this means a crop of over 205 bushels per family, and this in spite of the fact that, of course, with many engaged in hunting and fishing, all the Indians did not participate in growing this crop.

The kinds and quantities of grain grown were as follows:—

Grain	Bushels
Wheat	638,213
Oats	573,905
Barley	62,304
Rye	2,157
Indian Corn	450
Total	1,277,029

In addition to this the Indians raised 58,809 bushels of potatoes, 9,233 bushels of turnips and carrots, 57,697 tons of hay and 9,930 tons of green feed. They broke 6,896 acres of new land, summer-fallowed 20,519 acres, and cultivated 273 acres as gardens.

Good progress was also made in stock-raising, the number of cattle on the reserves having increased by about two thousand head during the year. In this article, however, attention is confined to the field crops.

In common with the crops of white farmers those of the Indians were not uniform. Generally speaking the smallest crops were harvested on the Manitoba reserves, returns were better in Saskatchewan, and bumper harvests were reaped in Alberta. On the reserves in the last-named province 417,951 bushels of wheat were harvested from 13,165 acres, being at the rate of 31.8 bushels per acre, a high average for any farming community. Agents report that the work of preparing the soil is being better done each year and that on some of the reserves it compares with that of the best white farmers.

The big crop of 1923 was of course primarily due to the bountiful harvest but it was also due to the increased area sown and to the good cultivation given the land. The progress made in regard to the two latter factors has been owing to the methods adopted for the teaching of farming. Farming is, of course, the chief industry taught to the boys of the residential schools maintained by the Department of Indian Affairs, but in addition to that the teaching is brought in a most practical manner right to each Indian farm. On each reserve there is a farm instructor who, instead of carrying on a model farm for the Indians to admire, is constantly on the move in a buggy or light motor car visiting all parts of the reserve advising, encouraging, exhorting, and reproving the Indian farmers. Thus, while there is no one "show" farm, all the farms on the reserve are raised to a higher level than they would be otherwise.

Hon. Charles Stewart, Superintendent General of Indian Affairs, whose knowledge of farming operations in Western Canada enables him to approach this subject from a practical standpoint, has given this matter personal attention and he is naturally pleased with the results. The Indian farmers of the prairies have still much to learn and much progress to make but the fact that in about forty years these wandering hunters have become settled and have progressed so far in farming as to reap a harvest of over twelve hundred thousand bushels of grain, shows that the efforts of the people and Government of Canada on their behalf have borne good fruit.

Prepared under the direction of Dr. Duncan C. Scott, Deputy Superintendent General of Indian Affairs.

Forest Protection by Aircraft—Photograph taken from a patrolling aeroplane at a height of about 4,000 feet above Clearwater river, Alberta, showing a forest fire starting in low brush and being carried towards the more heavily wooded area by the wind. In such cases a wireless message from the pilot to the local Forestry Branch headquarters sets forest protection forces in motion to combat the fire with the least possible loss of time.

THE USE OF AIRCRAFT IN PROTECTING TIMBER

(*Continued from page 1*)

after all, largely experimental, but the results secured have demonstrated beyond the possibility of doubt that the use of aircraft, given proper organization and suitable equipment, affords not only the most efficient but the only possible means of protection of this north country from fire. Air patrols operated in 1923 in parts of Quebec, Ontario, Manitoba, Alberta, and British Columbia. The field for development is almost unlimited. Increased use is dependent solely on the possibility of the reduction of the costs of operation which at the present time are exceedingly high, and recent experiments with light machines carrying engines of small horse-power have been so successful as to indicate that aircraft will shortly be developed which will go far to solve this difficulty by reason of smaller initial and lower maintenance costs.

NEW CANADIAN APPLE

The much prized Wilder Silver medal, the highest award of the American Pomological Society, the oldest horticultural body in North America, has been awarded to the Central Experimental Farm at Ottawa for the sixth time. The medal on this occasion was given for the Lobo apple, one of the many fine varieties of McIntosh Red parentage originated at the Central Farm. The Lobo is an apple very similar to the McIntosh, but ready for use about a month earlier, thus lengthening the season of apples of McIntosh appearance and flavor. It has proved very promising not only in the provinces of Ontario and Quebec, but in the state of New Jersey, where it has been fruiting for several years.

REGULATIONS

AMENDMENT TO QUARTZ MINING REGULATIONS

The Quartz Mining Regulations under which mineral claims comprising Dominion lands are acquired have been amended by an Order in Council dated the 14th of February, 1924, to provide that any person having located a claim shall have the right to locate another claim in the same district, after the expiration of a period of twenty days from the date of such location instead of sixty days.

Another amendment is to provide that, in future, it will not be necessary for an applicant to designate the kind of mineral he may have discovered, or to swear that he has discovered mineral in place. This amendment rescinds all reference to discovery that appears in the form of application and in the different sections of the regulations.

FISH FRY FOR NATIONAL PARKS

The Department of Marine and Fisheries announces the successful distribution in excellent condition of over one million salmon and trout fingerlings from the Banff hatchery during the past season. The trout included such species as cutthroat, rainbow, steelhead and salmon trout, and a considerable portion of them were from two to three months old when they were distributed. The distribution area included the waters of the Banff national park, Jasper park, Waterton Lakes park and various trout streams of the foot-hills between Edmonton and Macleod.

Next to Russia and the United States, Canada has the largest forest resources in the world. Care is taken to preserve the timber supply by aeroplane scouting, wireless telegraphy, portable telephones and power pumps, replanting, prevention of pests, forest product laboratories, stricter legislation, and Dominion and provincial reserves.

MARKED ADVANCE IN OUTPUT OF CANADIAN MINES

CONTINUED IMPROVEMENT IN MINING SITUATION

New Production Records Established in Both Metallic and Non-Metallic Groups

The continued improvement in the mining situation in Canada forecasted at the close of 1922 is borne out in estimates of the value of the mineral production during 1923 made by the Dominion Bureau of Statistics following a preliminary survey of the industry. The production of minerals—metallic, non-metallic, and building materials—advanced about 16 per cent over 1922 during the year just closed. The total estimated value of the output of our mines, $214,119,832, places the year 1923 among the banner years in Canada's mining development and second only to 1920 when the record value of $227,859,665 was attained. However, in taking the value of production during these two years into consideration, it is well to bear in mind that commodity prices had reached a peak during 1920.

The figures for the 1923 output as compared with those for the previous year are as follows:—

	1923	1922
Metallics	$ 84,187,783	$ 62,120,291
Non-metallics	92,938,961	82,642,210
Structural materials	36,993,088	39,534,741
Total	214,119,832	184,297,242

Although the improvement in the value of the output of metals is estimated at $22,067,492 it is noted that there was a slight decrease in the production of gold and silver. However new records were established in the output of lead and zinc, and in the total value of cobalt; the output of copper was more than double the tonnage of 1922, and nickel increased practically three and a half times. The high total in the production of lead reached 110,730,730 pounds, an increase of 18.6 per cent over last year; cobalt produced was valued at $2,753,157; the output of copper rose from 42,879,818 pounds in 1922 to 87,942,458 pounds last year; and nickel production increased from 17,597,123 pounds in the previous year to 62,453,843 pounds in 1923.

New output records were also established among the non-metallics where a general increase of 11.9 per cent was recorded. Coal and asbestos were among the leaders in the upward movement, the production of the former advancing from 15,157,431 tons in 1922 to 16,984,022 tons last year, and the latter reaching the new high total of 231,231 tons or an advance of over 41 per cent. Natural gas production was approximately the same as in the previous year, at a total of 14,675,760 thousand cubic feet. As indicated in the above table structural materials and clay products showed a decline of about 6.5 per cent aggregate value from 1922.

The production by provinces in order of value of output was as follows:—Ontario, $80,016,836; British Columbia, $44,143,390; Alberta, $31,646,816; Nova Scotia, $30,534,176; Quebec, $19,827,495; Yukon Territory, $2,641,745; New Brunswick, $2,205,846; Manitoba, $1,753,908; Saskatchewan, $1,349,620.

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FOREST FIRE PREVENTION CAMPAIGN AN UNQUALIFIED SUCCESS

The Winning Essay.

PROTÉGEONS NOS FORÊTS

Ce cri d'alarme est de la plus grande opportunité en ces jours qui ramènent avec les travaux et les plaisirs de la saison d'été une série de dangers pour nos bois. L'expérience est là pour prouver les conséquences terribles d'une seule imprudence! Aussi, combien sage est l'initiative des autorités en faveur de la protection forestière! Et comme tout ce qui touche au patrimoine national doit être sacré au cœur de tout bon citoyen et tout vrai patriote, quel Canadien-Français se désintéressera du problème essentiellement pratique de la préservation de nos belles forêts canadiennes?

La "Semaine de protection des forêts" et la proclamation ministérielle signée à cet effet sont donc d'heureux mouvements auxquels tous doivent coopérer dans la mesure de leur pouvoir et selon leurs occupations: quelques-uns, par la parole et par la plume . . . D'autres, plus directement, rapprochés qu'ils sont du champ d'action: colons, bûcherons, tous les intéressés dans l'exploitation forestière. Enfin, il y a les hôtes d'un jour: pêcheurs, chasseurs, excursionnistes, toute la théorie des habitués de nos bois.

A tous, le mot d'ordre est donné: Prudence!

Le plus grand ennemi de la forêt, c'est le feu. Enrayez ce fléau et l'avenir forestier de notre pays est assuré.

Que de richesses récèlent nos forêts canadiennes! Les immenses revenus qu'elles rapportent, les multiples ressources qu'elles fournissent aux industries, l'abondant gibier qu'elles renferment, les services qu'elles rendent en protégeant les sources de nos cours d'eau et en empêchant les inondations, etc. Toutes ces considérations suffisent amplement pour prouver "l'importance vitale de la protection et de la perpétuation de nos forêts."

N'oublions pas que d'un feu mal éteint, d'une cigarette jetée encore fumante peut jaillir l'étincelle qui allumera le grand incendie . . . La forêt entière, les villages circonvoisins peuvent être la proie des flammes . . . . Criminelle imprudence qui causera peut-être plusieurs pertes de vie . . . Quelle responsabilité!

Oh! que tous comprennent la nécessité de protéger nos forêts! "Mieux vaut prévenir que guérir," dit le proverbe, et dans la question qui nous occupe l'importance des mesures préventives s'impose d'autant plus qu'il est reconnu que là où la "vague rouge" a passé les dommages sont presque irréparables.

Observons les lois fédérales et provinciales contre l'incendie, rendons-nous familières les méthodes convenables "de préparer, d'utiliser et d'éteindre les feux," et surtout, mettons au service d'une bonne volonté intelligente, une prudence consommée.

La forêt, c'est un vestige du primitif aspect de notre belle Patrie, puisque Cartier, découvrant le Canada, "prit possession d'une immense étendue boisée . . . .

Je souhaite donc que le feu sacré du patriotisme inspire tous les Canadiens-Français à ce sujet . . . Quant à moi, petite vestale, je l'entretiens dans mon cœur et c'est pourquoi je vous dis: Gardons nos forêts si belles, aimons-les et protégeons-les toujours!

ESSAY GRAND PRIZE WON BY GERMAINE PAQUIN, QUEBEC, FINALIST IN "LE SOLEIL" CONTEST

THE MINISTER OF THE INTERIOR'S MESSAGE

Save the Forest Week, 1924, has been an unqualified success. The willing offers of co-operation received from the railways, the large financial institutions, the various service clubs, and the energy and enthusiasm displayed by the school-teachers and the press gave promise of great things. But in the event our most sanguine expectations were surpassed. Never before has the forest-fire situation been so forcibly presented to the Canadian people, and never before has so much interest been shown in this most vital problem. There is no doubt whatever that as a result of this campaign increased care will be exercised in the use of fire in the woods with a corresponding reduction in the losses from preventable fires.

One of the most interesting features of the campaign was the conduct of essay competitions on forest-fire prevention undertaken by a number of newspapers throughout the Dominion. The Department of the Interior donated prizes for each contest, a grand prize for the writer of the best essay from all Canada, and a silver cup to be presented to the school attended by the winner of the grand prize. The number and the literary quality of the essays received prove conclusively the interest displayed by the school teachers all over the Dominion in guiding and advising the contestants. They have undoubtedly devoted time and trouble without stint in emphasizing the salient features of our Canadian forest-fire problem.

While of course the prizes offered presented some inducement, nevertheless there is good reason to feel that the importance of the subject as presented by the newspapers and by the teachers in the schools had a very considerable bearing on the attitude of the children toward the contests. In these essays one point stands out in great prominence, that is, that the flame of patriotism burns brightly in the hearts of the coming generation.

The winning essays in the newspaper competitions were forwarded to the Acting Director of the Forest Service of the Department of the Interior. From these the essay presented in full in this issue has been awarded the grand prize as the best essay written in all Canada.

On behalf of the Government of Canada, I congratulate the children who won the prizes, the teachers who assisted them, and the several newspapers on the great success attending the competitions. Especially, do I congratulate Germaine Paquin, l'Academie Mallet, Quebec City, and *Le Soleil* newspaper on the admirable essay awarded the grand prize. Little Mlle. Paquin's fervid patriotism is a symbol to inspire hope and confidence in the future of our country. The province of Quebec may well be proud of her daughter who, in competition with all Canada, has won the laurel wreath.

CHARLES STEWART,
Minister of the Interior.

Note.—For names of district prize winners, see page 3.

Translation.

LET US PROTECT OUR FORESTS

This note of warning is most opportune in these days which bring back, with the labours and pleasures of the summer season, a series of dangers for our woods. Experience has proved the terrible consequences of a single imprudence! How wise, therefore, is the initiative of the authorities in favour of forest protection! And as everything which concerns our national patrimony ought to be sacred to the heart of every good citizen and every true patriot, what French-Canadian will become indifferent to the essentially practical problem of the preservation of our beautiful Canadian forests?

The "Save the Forest Week" and the ministerial proclamation signed to this effect are, therefore, excellent movements in which all ought to co-operate as far as they are able and according to their occupations: some by speech and writing; others, more directly, as they are nearer to the field of action, such as settlers, woodsmen, and all those interested in the exploitation of the forests. Lastly there are the guests of a day, fishers, hunters, picnickers, the whole series of frequenters of our woods.

To all, the word of command is given: Be careful!

The greatest enemy of the forest is fire. Stop this scourge and the forest future of our country is assured.

What wealth our Canadian forests contain! The immense revenues that they bring, the multiple resources that they supply to industries, the abundant game that they contain, the services they render in protecting the sources of our water courses and preventing floods, etc. All these considerations are amply sufficient to prove "the vital importance of the protection and perpetuation of our forests."

Let us not forget that from a badly extinguished fire, from a cigarette thrown away while still smoking, there may break out the spark which will light a great fire. The entire forest and the surrounding villages may be the prey of these flames. Criminal carelessness which will perhaps cause the loss of several lives. What a responsibility!

O that all may understand the necessity of protecting our forests! "Prevention is better than cure," says the proverb, and in the question which we are considering the importance of preventive measures obtrudes itself all the more as it is recognized that in the place where the "red wave" has passed, the damage is almost irreparable.

Let us observe the Federal and Provincial laws against fires, let us make ourselves familiar with the proper methods "of building, using and extinguishing fires," and especially let us put at the service of intelligent good-will a consummate prudence.

The forest is a vestige of the primitive aspect of our beautiful country, since Cartier, on discovering Canada "took possession of an immense wooded area . . . ."

I pray, therefore, that the sacred fire of patriotism may inspire all French-Canadians on this subject. As for me, a little vestal, I cherish it in my heart and that is why I say to you:

Let us guard our very beautiful forests, let us love and protect them always!

PRIMARY PRODUCTS OF DOMINION'S FORESTS

Depletion of Timber Resources over Five Billion Cubic Feet in 1922

The increasing attention which is being given to the important subject of the conservation of our forest resources makes of great interest to all Canadians the following estimate of total forest production in Canada recently prepared by the Dominion Bureau of Statistics for the calendar year 1922. This estimate includes all unmanufactured material cut in the Dominion's forests and is the first attempt that has been made to estimate in detail the rate at which our forests are being exploited.

Saw logs for domestic use head the list as far as total value is concerned with over $55,000,000 worth of material produced. Pulpwood for domestic use comes second with a total value exceeding $40,000,000: Firewood with $38,000,000, railway ties with $13,000,000, and pulpwood for export with over $10,000,000 are among the more important items. The total estimated value of all primary forest products is $170,850,096.

As these products are measured by different units, the total quantity can only be estimated by referring them to a common measurement. In each case a converting factor is used which represents, in cubic feet, the quantity of standing timber required to produce the material in question. In this way it has been estimated that the total output of these products in 1922 represented an equivalent volume of 2,377,845,182 cubic feet of standing timber. Destruction of forest growth by fires, insects, fungi, and other destructive agencies would probably bring the total depletion to more than five thousand million cubic feet per annum.

With regard to annual consumption for use, the production of firewood is the heaviest drain on our forest resources amounting in 1922 to almost nine million cords or an equivalent of almost eight hundred and fifty million cubic feet of standing timber. Pulpwood for Canadian pulp and paper mills amounted to about three million cords, equivalent to about three hundred and fifty million cubic feet. Other products in order of importance from the quantity standpoint were, railway ties, pulpwood for export, logs for export, fencing material, mining timber, square timber for export, hardwood for distillation, poles, and miscellaneous products.

Quebec leads in forest production in both quantity and value of products. Ontario is next in importance, with British Columbia, Nova Scotia, and New Brunswick following in the order named.

The exportation of unmanufactured forest products from Canada in 1922 amounted to $19,550,672 and represented a total of 216,172,405 cubic feet of standing timber. This exported raw material formed about nine per cent of the total forest production and was made up chiefly of pulpwood with smaller quantities of logs, square timber, railway ties, and miscellaneous products.

The quantity and value of primary forest products in 1922 by products and by provinces are given below:—

BY PRODUCTS

Product.	Equivalent Volume in Standing Timber (M cu. ft.)	Total Value (M $).
Firewood	841,781	38,229
Ties	174,697	13,216
Poles	5,680	1,707
Posts	27,697	1,354
Rails	10,531	450
Mining Timber	15,436	1,721
Wood distillation	7,278	479
Logs sawn	746,410	55,066
Pulpwood used	340,775	40,376
Miscellaneous products	9,927	850
Sq. timber exported	12,076	1,492
Logs exported	40,622	3,271
Pulpwood exported	118,326	10,360
Miscellaneous exports	26,611	2,279

BY PROVINCES

	(M cu. ft.)	(M $).
Total for Canada	2,377,845	170,850
Quebec	794,951	56,982
Ontario	655,605	52,640
British Columbia	447,433	30,667
New Brunswick	200,993	15,628
Nova Scotia	107,605	7,090
Alberta	54,821	2,502
Manitoba	52,097	2,596
Saskatchewan	49,399	2,089
P. E. Island	14,942	667

IMPORTANCE OF STREAM FLOW DATA

Fullest Development of Dominion's Power Resources Based on Records of Measurements

Power, like any other commodity, must be produced in quantities and at a cost to meet the market demands. The cost of power is made up of interest on capital invested in the plant, of raw material and supplies, labour and overhead. The two main sources of Canadian power are fuel and water.

Hydro-electric development differs from fuel power development in that in the former case the main capital expenditure must be incurred at the outset. The expenditures for the site, flowage and water rights, the dam, the power house foundations and the larger portion of those for turbines, electrical equipment and transmission lines, have to be made at the start. With fuel power developments, on the contrary, the initial capital expenditure per unit of power delivered is usually much lower, and extensions can be readily made as the demand for energy increases.

Importance of Stream Flow Data—Photograph shows a hydrometric recorder metering from a cable station on the Winnipeg river, Manitoba. The meter can be seen at the surface of the water in the process of being lowered.

Therefore, while the cost of supplies and labour per unit of power is very much lower in the case of the water-power development, the interest charges are very much larger, and it is essential that no development be undertaken until full and reliable data have been secured, so that the capital cost and the power available can be estimated within narrow limits.

The Department of the Interior administers the water-power resources of the Prairie Provinces and of the Yukon and North West Territories, and in order that its administration may be sound, secures, in advance, complete and reliable data concerning any site where there is a possibility of development within a reasonable period.

The quantity of power available at any site is proportional to the product of available head and flow of water. The head can be readily measured but the flow or supply of water varies from day to day and from year to year. In order to obtain reasonably accurate data concerning water supply, it is necessary to maintain an organization which, by frequent measurement of flow and constant record of water level, secures over a series of years the daily fluctuation of water supply. That these records may reasonably accurately reflect the minimum, average and flood conditions to be anticipated in any stream, they should cover a period of at least ten years, and longer still in the case of the more important rivers.

The importance and value of the work of the Department of the Interior in its systematic measurement of stream flow, and in the methods which have been devised for analysing and recording such data, have been recognized by the provinces which control their own water-power resources, with the result that, upon their invitation the Department has extended its stream measurement work beyond the limits of the Dominion Crown Lands and is now carrying on a water resources survey throughout the Dominion. This work is done by the Dominion Hydrometric Survey, a part of the Dominion Water Power and Reclamation Service.

Once the essential flow data is available surveys may be undertaken to determine conditions at the site—nature of foundations, construction and transportation facilities, etc.—following which, plans can be prepared and the cost of development fairly definitely determined.

It is the policy of the Department, within the territory over which it has administrative jurisdiction, to carry out general surveys of the principal power rivers, in order that it may intelligently decide the manner in which they shall be developed. The general economic ultimate possibilities of a whole river must not be sacrificed for the purpose of securing a single development which might be temporarily advantageous.

The Department must, therefore, be in a position to formulate and decide a policy of development which will secure the best possible ultimate complete use of the natural power capacity of the rivers under its jurisdiction.

In the devolpment and utilization of her water power resources, Canada has made striking progress. The known available water power in Canada is 18,225,000 horse power, under conditions of ordinary minimum flow, and 32,076,000 horse power available for six months in the year. Already over 3,225,000 horse power has been developed, representing a capital investment of over $687,000,000, easily placing this industry among the country's largest activities.

PROGRESS IN MINING IN YUKON TERRITORY

Placer and Quartz Claims in Good Standing Cover Nearly 65,000 Acres

The report of the Mining Recorder of the Yukon Territory for the calendar year 1923 contains some interesting information regarding progress there.

The statistics in regard to claims are as follows:—

Placer Mining, grants, 25; renewals, 56; relocations, 5.

Quartz Mining, grants, 121; renewals, 1,052; claims in good standing, 1,312. In connection with the claims in good standing it is interesting to note that as a full quartz claim is over 50 acres in extent these claims represent an area of approximately 65,000 acres, or over 100 square miles.

The total amount of ore shipped from Mayo Landing in the summer of 1923 was 8,762½ tons. Since no ore is bagged that assays less than 200 ounces in silver to the ton, this output represents a large revenue.

Of numerous new veins uncovered last year the most promising are those of the Lake Group where interested parties combined in diverting a large flow of water with the result that the overburden was washed in several places to a depth of thirty feet exposing veins of silver ore from which assays have been obtained sufficient to warrant the owners arranging for the necessary equipment and supplies to carry on additional exploratory work.

The Keno Hill Mining Company ceased operations on Keno Hill and transferred its equipment to the Friendship Group adjoining the Treadwell Yukon Company property on the south. This company has built a permanent camp and carried out a considerable amount of exploratory work to date. It employs an average of thirty-three men.

The Treadwell Company employs an average of eighty-one men for its work inclusive of the work of the wood camp. It carried on extensively during the past year and erected a large new office and warehouse and has several ten-ton caterpillars hauling ore to the landing.

In addition to the number of men employed by the different companies in both quartz and placer mines, there were about 150 prospecting and working their own ground. There have been no serious accidents, no labour troubles and very little sickness. A new placer strike was made at the mouth of Gull creek as a result of which over twenty claims were staked.

AVAILABILITY OF CANADIAN WATER-POWER

A striking feature of the water-power resources of Canada, over and beyond that of the amount available being so great that its exhaustion is indefinitely far in the future, is the fact that there are advantageous sites located near all the centres of population from coast to coast, with the exception of certain small areas in Alberta and Saskatchewan where ample coal resources are available. Particularly is this availability in evidence in the eastern centres of industry, where there is still available some 13,000,000 horse-power of undeveloped water-power.

The number of pure-bred swine in Canada in 1921 totalled 81,143, a gain of 43.7 per cent over 1911.

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OTTAWA, JUNE, 1924

SAVE THE FOREST WEEK
ESSAY COMPETITIONS

The essay competitions in connection with "Save the Forest Week" were carried on in a number of districts covering the whole of Canada. Newspapers in each district conducted the local competitions—appointing their own judges who rated the essays and made the awards—and the Department of the Interior donated the prizes. The first prize in each case was a radio receiving set. In addition to the above the Department provided a more powerful radio set to be awarded as the grand prize for the essay adjudged the best in all received, and also a valuable silver cup for presentation to the school attended by the winner of the grand prize The general conditions governing the competitions were that essays might be written in either English or French and that the participants must be children under sixteen years of age.

The name of the winner of the grand prize has been announced on the first page and the names of the prize winners in the district contests are given below. The name of the newspaper conducting the contest appears first in order in each case, followed by the winner's name, and the name of the school attended.

Patriot, Charlottetown, P.E.I., Bernedette MacMillan, Notre Dame Academy, Charlottetown.

Morning Chronicle, Halifax, N.S., Sheila McKay Tait, Colchester Academy, Truro.

Transcript, Moncton, N.B., Hester Joncas, New Mills School, N.B.

Mail, Fredericton, N.B., Juliette Senna, Regent Street School, Fredericton.

Le Soleil, Quebec, Que., Germaine Paquin, l'Académie Mallet, Quebec.

Daily Telegraph, Quebec, Que., Pauline Saindon, Convent of Jesus and Mary, Sillery, Que.

La Nouvelliste, Three Rivers, Que., Françoise Cossette, Academy, St. Narcisse de Champlain, Que.

St. Maurice Valley Chronicle, Three Rivers, Que., Doreen Madison Wood, school not given.

Herald, Montreal, Que., Gertrude Goldstein, Baron Byng High School, Montreal.

La Presse, Montreal, Que., Gerard Bergeron, l'Académie Querbes, Outremont, Montreal.

Citizen, Ottawa, Ont., C. J. Woodsworth, Lisgar Street Collegiate Institute, Ottawa.

Globe, Toronto, Ont., Georgina Green, North Toronto Collegiate Institute.

Advertiser, London, Ont., Walter A. Paterson, Continuation School, Rodney, Ont.

Nugget, North Bay, Ont., Arnold J. Barker, North Bay Collegiate Institute.

Star, Sudbury, Ont., Stanley Butler, Sudbury High School.

Times-Journal, Fort William, Ont., Marguerite Peterson, school not given.

Canadian Farmer, Winnipeg, Man., Natalia Hykawy, Isaac Newton Junior High School, Winnipeg.

Free Press, Winnipeg, Man., Katherine Hamilton, Kelvin Tech. High School, Winnipeg.

Herald, Dauphin, Man., Wm. T. Stainton, Dauphin Collegiate Institute.

Leader, Regina, Sask., Jean Stuart, Consolidated School No. 972, Cupar, Sask.

Herald, Prince Albert, Sask., Edward Lussier, Prince Albert Separate School.

Herald, Lethbridge, Alta., Frances Bernard, Lethbridge High School.

Bulletin, Edmonton, Alta., Léon Gibbs, Victoria High School, Edmonton.

Herald, Grande Prairie, Alta., Mary Josephine Anderson, S.D. No. 3600, Sexsmith, Alta.

Courier, Cranbrook, B.C., Lillian Campbell Lewis, Cranbrook Public School.

Telegram, Kamloops, B.C., Anna McMordie, Public School, Lytton, B.C.

Citizen, Prince George, B.C., Jack Coates, Prince George High School.

Sun, Vancouver, B.C., Alice Wagner, General Gordon School, Vancouver.

Daily News, Prince Rupert, B.C., Cecil Hasker, school not given.

As soon as possible the Forestry Branch of the Department of the Interior will issue for distribution a pamphlet containing all the district first-prize essays.

The 1921 agricultural census reported 296,656 pure-bred cattle in Canada, being an increase of 139.43 per cent since the last ten-year census.

FUR CATCH RETURNS IN YUKON TERRITORY

Comparative Table Shows Exports of Pelts during 1922 and 1923

Furs are an important part of the production of the Yukon Territory. Under the fur export tax ordinance the record is kept of all furs exported from the Territory and as the great bulk of the furs taken are exported, this gives a practically complete statement of the fur catch in the Territory from year to year. The following table supplied by the North West Territories and Yukon Branch shows the numbers of the different kinds of furs exported in the twelve months of the ordinance year ending on July 31, 1923, and also the numbers exported in the previous twelve months.

	Year Ending July 31, 1923	Year Ending July 31, 1922
Weasel	2,508	3,897
Muskrat	36,960	59,491
Lynx	1,433	626
Wolverine	271	329
Bear	225	341
Otter	81	63
Marten	964	1,786
Mink	1,754	1,289
Fox, Red	1,136	1,208
Fox, White	78	38
Fox, Cross	360	387
Fox, Silver	162	137
Wolf	154	118
Coyote	112	86

CARRYING ON SURVEYS ON GREAT SLAVE LAKE

Exploration of Eastern and Northern Shore Aids to Navigation Provided

The steadily increasing travel into our northland along the Mackenzie valley has rendered necessary the survey and charting of that great system of waterways which extends from the centre of the province of Alberta to the Arctic Circle. For over a century this has been the great thoroughfare for northern travellers, but the large increase of late years in the number and particularly of the size of the boats employed makes it necessary that the aids to navigation be correspondingly improved. This work has been entrusted to the Topographical Survey of Canada and during the past three years a programme of surveys has been carried out, which by defining the prominent features of the district has done much to aid navigation and development.

From the surveys made of the tract under investigation, which comprises an area of over 250,000 square miles, a series of maps has been prepared showing navigable channels and topography of use to the navigator, prospector, and economic investigator.

One of the most interesting of these surveys has been that of Great Slave lake. The through travel in the Mackenzie valley passes along the western side of this lake and in the seasons of 1921 and 1922 special attention was devoted to aids to navigation here. This work was continued in 1923 and the lights established at the entrance to Hay River harbour and the buoys and beacons placed at the dangerous approaches to Slave and Mackenzie rivers have proved of great assistance to navigation. The need and value of this work is shown by one incident. Some years ago a steamer ran on a boulder reef a considerable distance from shore. A period of calm weather permitted the saving of the steamer, but the knowledge of the existence of this reef, of which the exact location was not known, was a cause of anxiety to navigators. In 1922 an unsuccessful search was made for this reef by the Survey, but efforts continued in 1923 led to its discovery and to its being marked on charts and located by a buoy.

During 1923 attention was chiefly directed to the northern and eastern parts of the lake and to the territory lying beyond. The north arm of the lake is surrounded by a district rich in furs and minerals. Surveys conducted into this region during the past season resulted in the discovery and mapping of nearly 1,000 small new islands, the correction of the location of Fort Rae, by some 20 miles in longitude, and the finding of a connected body of water over 30 miles long.

The eastern arm of Great Slave lake was surveyed in 1922. Exploration the past season was directed into the country lying to its east and north. The work extended from the east end of the lake to the straits of Tha-Na-Koie, joining Aylmer and Clinton-Colden lakes, which are situated some 200 miles within the so-called "Barren Lands". The survey showed that in addition to mineral possibilities, the country is suited to the musk-ox and caribou, with sufficient grass, mosses and other vegetation to support the great herds of the latter frequently seen. The waters teem with fish of a size and quality unknown to the warmer waters to the south, and at the very edge of the timber line, in sheltered places, spruce and tamarack reach to commercial proportions.

CHARACTER OF THE ESSAYS

The general high character of the essays in the "Save the Forest Week" Essay Competitions and the effect of the competitions in arousing interest in forest conservation is shown in the comments given below.

The board of judges of one of the most important contests reported as follows:—

"By far the greater number of essays showed a good grasp of the subject and many were original and contained excellent practical suggestions. In fact the large number of essays of merit rendered the task of selection very difficult. All competitors were evidently imbued with a sense of the value of the forests, and the duty of taking precautions against fire, and displayed public spirit which would have been creditable to persons of mature years."

The chairman of another board of judges made the following statement:—

"What impresses me about these essays, indeed all of them, is the expression of constructive ideas on how to save our forests, combined with an excellence of style not often found in the written work of children. The essays reflect great credit not only on the individual writer but also on the schools attended by the children and on their teachers. If these essays are typical of the essays submitted throughout Canada, and of the deep interest created by this competition on the part of the children of Canada, there need be no fear for the future conservation of our

STOCKING LAKES IN JASPER PARK

To facilitate the stocking of the lakes in Jasper National park, a number of troughs were recently set up in the basement of the Administration Building at Jasper, Alberta. They are at present carrying Loch Leven trout eggs, and further shipments of other varieties will be furnished by the Department of Marine and Fisheries from time to time and the resultant fry distributed in the waters of the park.

CANADIAN TROUT FOR SCOTLAND

The Department of Marine and Fisheries, Canada, has forwarded 20,000 salmon trout eggs *(Cristivomer namayoush)* from St. John, New Brunswick, to the Solway hatcheries, Dumfries, Scotland, for experimental purposes. They were collected last autumn in lake Ontario and carried to the eyed stage in the Thurlow hatchery, near Belleville, Ontario.

A collection of one million speckled trout eggs was made in Boundary and Violin lakes in southern British Columbia by officers of the Department of Marine and Fisheries. This collection is notable as speckled trout are not indigenous to British Columbia and the eggs in question are the result of small numbers transferred from the East some years ago.

REGULATIONS

TIMBER REGULATIONS—AMENDMENTS MADE IN 1924.

As provided by Order in Council a number of amendments to the Timber Regulations applicable to Dominion lands in the Prairie Provinces, and the Peace River Block and Railway Belt of British Columbia went into effect on May 1, 1924. The new Regulations have been issued in printed form and copies may be had by those interested upon application to the Secretary, Department of the Interior or to the Director, Timber and Grazing Branch, Department of the Interior, Ottawa. A synopsis of the most important changes is given below.

Deposit With Application.—In some cases persons have applied for a license berth, and after the Department has been put to considerable trouble and expense in cruising and advertising, they failed to attend the auction, and the sale has been abortive. To obviate this an applicant for a license berth must forward with his application a deposit of a certain amount according to the area of the tract applied for in order to show his bona fides.

Unpaid Instalments.—Formerly the purchaser of a license berth had to furnish within ten days of the sale a bond from a guarantee company for payment of every unpaid instalment. This has been eliminated, and the outstanding instalments of the purchase money will now be covered by promissory notes.

Rates of Dues.—Numerous changes have been made in the rates of dues chargeable under license and permit. In the case of railway ties, the Department has divided them into several classes, viz., Nos. 1 and 2; No. 3 and cull, both hewn and sawn; and poplar ties, designating a special rate for each class. Lath has been divided into three classes as Nos. 1, 2, and 3.

Dues on Slabs and Edgings.—Formerly the licensee paid 25 cents per cord on poplar and 40 cents per cord on other timber. These dues have been reduced to licensees to 25 cents per cord on all kinds of timber, and to 10 cents per cord on slabs and edgings, residue from lath mills. The permit rates on the same material are 40 cents and 20 cents per cord, respectively.

Portable Saw-mill Berths.—An applicant for a portable saw-mill berth must deposit $25 for each quarter-section included in the berth before the issue of permit, the deposit to be retained until the berth is cancelled as a guarantee for satisfactory compliance with the Regulations. This is in addition to the $10 which must accompany the application. It is provided that the holder of a portable saw-mill berth will pay dues on the manufactured product as sold, while the holder of a permit berth (commonly called "cordwood berth") will pay royalty on the product as manufactured.

Increase in Cash Bonus.—In connection with the sale at public auction of fire-killed berths to the bidder offering the highest cash bonus, the cash bonus will be not less than $10 per quarter-section, or fraction thereof, of the tract offered, and the purchaser must make a cash deposit of not less than $50 per square mile or fraction thereof. This deposit will be retained until the berth is cancelled and all requirements satisfactorily complied with.

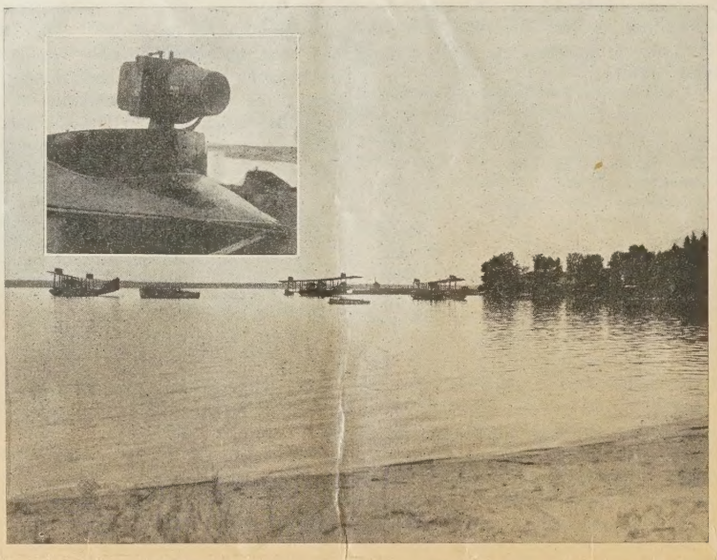
Permits on Isolated Fringes of Timber.—On isolated fringes of timber lying immediately outside of license berths the amended Regulations do away with the $100 fee and ordinary dues, and substitute the usual office permit fee of $1 and dues 15 per cent in advance of the ordinary permit rates.

Fuel Allowance for Residents on Farm Lands.—Where formerly a homesteader was permitted to include in his free allowance of timber, providing application had been made within 5 years from date of entry, 30 cords of dry wood, this privilege has been rescinded, and in substitution provision is made that settlers residing on farm lands, who have no timber, shall be allowed to cut, free of dues, fuel for their own use from dead or fire-killed timber up to a quantity not to exceed 15 cords in a permit year.

FLYING OPERATIONS DURING 1924*

Growth of Work Assigned to Royal Canadian Air Force—Increase in Patrols and Surveys

A programme of flying operations to be undertaken this season by the Royal Canadian Air Force for other Federal Government departments has now been drawn up. The steady growth of this work is the best proof of its usefulness and each year brings an increase in the number, variety, and extent of the operations called for from the Air Force by other branches of the government service.



Flying Operations during 1924—A squadron of seaplanes at anchor at the base. Forest patrols and photographic survey operations are carried out from this point. Inset—An aerial camera mounted on the nose of a seaplane.

As in the past, the work for the Forestry and Survey Branches of the Department of the Interior is the largest item on the programme. The plans for 1924, however, show an important addition which opens up a new phase of activity in aviation. This is a request from the Fisheries Branch of the Department of Marine and Fisheries for a continuance, and a large extension, of the experimental patrols carried out last year on the Pacific coast for the prevention of illegal fishing and other allied work in connection with fisheries protection. The base chosen is at Prince Rupert and extensive patrols will be carried out from there covering the entire coast of northern British Columbia and the islands adjacent to it.

The success of the photographic operations undertaken for the Topographical Survey Branch of the Department of the Interior is best shown in the large increase in the area to be covered by aerial surveys this year. The actual mapping work is under the Topographical Survey and as will be seen from the large amount of work proposed, progress is being made in the development of methods of utilizing the information shown on aerial photographs for practical mapping purposes.

The fact that aircraft can be used successfully in forest protection is now fully established. The only remaining step is to perfect organization and develop equipment which will ensure maximum efficiency at costs within the economic means of forest authorities. The R.C.A.F. and the Dominion Forest Service are bending all their energies to this end. The necessary practical experience and working knowledge of essential factors involved in reducing costs are being obtained through large scale air operations in Manitoba and Alberta. These operations to-day serve a double purpose. They provide patrols for areas otherwise impossible of protection, and at the same time serve as proving grounds in which organization and material can be developed suited to the needs of all forest protective agencies.

Details of the programme are given below with an estimate of the flying time required to carry out each operation:—

Department of National Defence

Air Service.—Air Force practice, machine tests, engine tests, wireless tests, etc., 300 hours; flying training for R.C.A.F. service pilots and cadets, 1,000 hours; total, 1,300 hours.

Militia Service—Flying as necessary in connection with Militia Courses of Instruction at Esquimalt, Sarcee, Sherbrooke, Petawawa, and Halifax, 82 hours.

Department of the Interior

Forestry Branch—Patrol of the forest areas in the Railway Belt of British Columbia in periods of unusual fire hazard, 40 hours; routine patrols of the forest reserves on the eastern slope of the Rocky Mountains from the Clearwater river to the International Boundary, 700 hours; patrols of the forests in Manitoba, east, north, and northwest of lake Winnipeg and experimental patrols over northeastern Saskatchewan, 800 hours; sketch mapping of young timber growth areas in the French River section, Ontario, 20 hours; experimental work in forest surveying by aerial photography, 30 hours; total, 1,590 hours.

Topographical Survey Branch—Vertical photography in the Edmonton district, of an area of 520 square miles, in the vicinity of Vermilion, of an area of 2,592 square miles, and in the Wainwright district, Alberta, all for map revision purposes, 59 hours; oblique photography of an area of 3,224 square miles in the vicinity of Edmonton, Alta., for map revision, 24 hours; oblique photography over water courses in northern Saskatchewan, including the Churchill and Reindeer rivers, Reindeer, Churchill, and Ile a la Crosse lakes, for mapping purposes, 35 hours; oblique photography over water courses in the Kississing Lake district, and of Crosse Lake and Oiseau districts, Manitoba, for mapping purposes, 49 hours; oblique photography in connection with map revision in the counties of Digby, Yarmouth, and Shelburne, Nova Scotia, 23 hours; vertical photography in the districts of Windsor and New Glasgow, N.S., 10 hours; total 200 hours.

National Parks—Routine fire patrols in the Waterton Lakes National Park, included under patrols of forest reserves on eastern slope of Rockies for Forestry Branch; photographs of islands in Georgian bay for survey purposes, 15 hours.

Water Power Branch—Photographs of water-power developments and sites for future development, 10 hours.

Department of Indian Affairs—Transportation of Indian agents to points in the Norway House agency and Group 3, Clandeboye agency, 18 hours.

Department of Marine and Fisheries—Fishery patrols to prevent illegal fishing in British Columbia coastal waters, 300 hours.

Grand total for all Federal Departments, 3,515 hours.

** Prepared from information supplied by the Department of National Defence, Canada.*

The total distribution of all species of fish eggs and fry by the hatcheries operated throughout the Dominion by the Department of Marine and Fisheries reached 878,987,093 during the season of 1922. This was an increase of 33,000,000 as compared with 1921 and was 128,500,000 greater than in 1920.

CURRENT REPORTS

The Report on an Exploratory Survey in 1900 between Great Slave Lake and Hudson Bay.—This report by Mr. J. W. Tyrrell, D.L.S., which was out of print, has been re-issued as an extract from the Annual Report of the Department of the Interior, 1901. It gives an introductory historical sketch of the earlier explorations of the area lying east and north of Great Slave lake. Mr. Tyrrell's report of his own explorations is very interesting and contains a large amount of information about the country along the water route traversed by him. He also tells of his experiences on his cross-country trip of 160 miles alone, while his party followed the more circuitous canoe route.

Copies may be had upon application to the Topographical Survey of Canada, Department of the Interior, Ottawa.